

PUBLIC WORKS

Jan.
1953

CITY, COUNTY AND STATE

**Reducing Effect on Traffic
of Street Openings**

**How Garbage Grinders
Affect Sewage Treatment**

**Lessons from the Portland
Water Works System**

**New Plant Treats Sewage
and Facilitates Research**

**Vermont Trains Aides to
Meet Engineer Shortage**

**Sewage Pumping Station
Joins Country Club Set**

**POLLUTED WATER
is almost as bad as
NO WATER**



Don Bloodgood uses an effective background of pictures and displays to teach sanitary engineering to Purdue students. More on page 22.

You'll be ^{}Convinced in 3 minutes!*



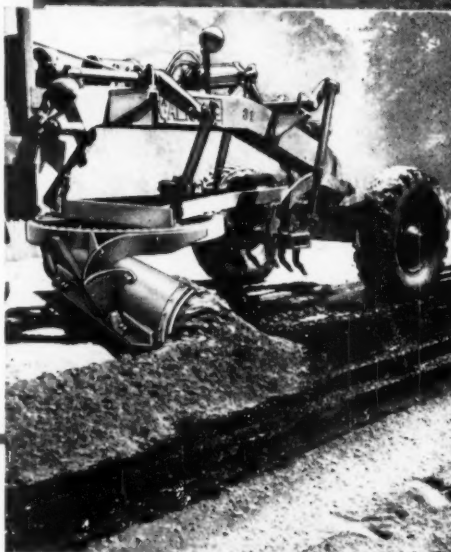
PROVE IT TO YOURSELF !

When you start a GALION Motor Grader thru its paces, you will quickly sense advantages over competitive Motor Graders. Because —

- **SIMPLIFIED HYDRAULIC CONTROLS**
give you simplified operation.
- **MANUAL STEERING WITH HYDRAULIC BOOSTER**
gives you ease of operation — minimum muscle work.
- **LARGE FRONT TIRES**
give you extra clearance — less slippage — better flotation.
- **GEAR TYPE TANDEM DRIVE**
gives you a positive four wheel drive.

***You'll be convinced that GALION Graders give you most for your money on any grading job.**

Contact the nearest Galion Distributor for a demonstration—then drive it yourself to prove it to yourself.



MOTOR GRADERS · ROLLERS

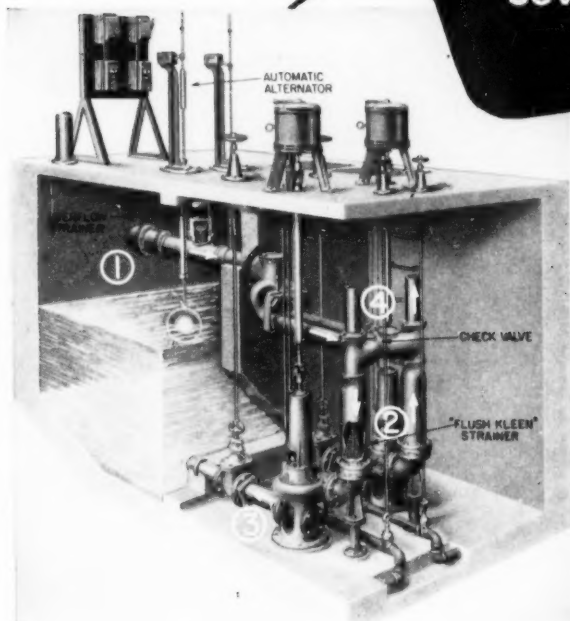


THE GALION IRON WORKS & MFG. CO., General and Export Offices, Galion, Ohio, U.S.A.

Cable address: GALIONIRON, Galion, Ohio

FLUSH-KLEEN Sewage Ejectors

Over
12,000
In
Service



Flush-Kleens are absolutely clog proof. Here are the reasons why: Flush-Kleen pumps automatically backwash the strainers, keeping solids from basin and pumps, with the impellers handling water only—this is accomplished as follows:

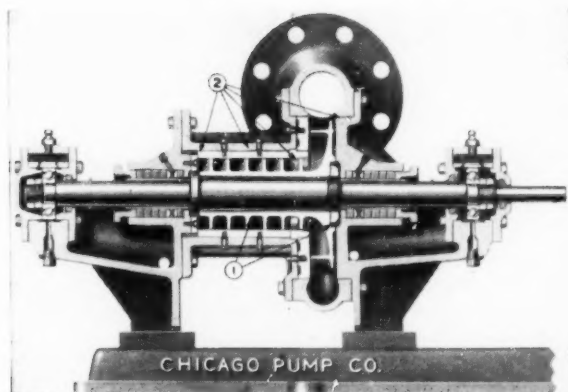
FILLING WET WELL . . . 1. Sewage flows through inlet pipe. **2.** Coarse matter is retained on strainer. **3.** Strained sewage flows through idle pump to wet well.

PUMPING . . . 3. Strained sewage is pumped from wet well. **2.** Coarse matter is backwashed from strainer. **4.** Special check valve closes; sewage and coarse matter are pumped to sewers.

CHICAGO
SEWAGE
EQUIPMENT

More
Than
8,000
In Use

SCRU-PELLER Sludge Pumps



Scru-Peller Pumps are simple in design, positive in operation and are truly clog-proof—here's why:

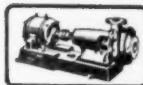
- 1. SCREW AND IMPELLER** are keyed on the shaft. The screw has two flights and the impeller has two blades. Each flight in the conveyor connects directly with its own blade of the impeller.
- 2. CUTTING EDGES.** There are four stellited cutting bars and a shear ring in the screw housing. Four more cutting bars are in the pump casing. The stellited edges of the screw and the edges of the impeller blades act against the cutting bars and shear ring, completely chopping all coarse solid material into small pieces that cannot clog or slow the pump.

CHICAGO PUMP COMPANY

SEWAGE EQUIPMENT DIVISION

622 DIVERSEY PARKWAY

Flush Kleen, Scru-Peller, Plunger.
Horizontal and Vertical Non-Clogs
Water Seal Pumping Units, Samplers.



CHICAGO 14, ILLINOIS

Swing Diffusers, Stationary Diffusers,
Mechanical Aerators, Combination
Aerator-Clarifiers, Comminutors.

Complete literature and
engineering data will be
sent on request.



Blow that snow!

Typical of counties in the northern snow regions is Dakota County, Minnesota. In an average winter there's three feet of snow on the ground most of the time, and with ordinary plowing it piles up along the road shoulders in six-foot walls.

Now Dakota County has a new method of snow removal. A Domor Snow Blower, mounted on a Cat No. 12 Motor Grader with a Caterpillar Snow Wing, shoots the snow out of the way in a single cut.

The No. 12 is an all-year tool that handles general highway maintenance, cleans out ditches, puts in culverts, mixes blacktop and plows snow. With positive starting in any weather, it has the power, balance and versatility that operators want. And road commissioners and taxpayers like its economical performance.

Dakota County officials say: "With a plow and wing all we could do was pile snow up on the road shoulders. In a hard blow it was right back on the road again.

The Domor Blower is very simple and from our experience it will help eliminate the drift problem and give us space for snow storage."

Your Caterpillar Dealer will gladly demonstrate the advantages of Cat equipment for county use. And he backs the machines he sells with reliable service and genuine Caterpillar parts.

CATERPILLAR, PEORIA, ILLINOIS

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TRACTORS • MOTOR GRADERS
EARTHMOVING EQUIPMENT**

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The 1953 volume of Public Works will be available on microfilm through University Microfilm, 313 N. First St., Ann Arbor, Mich.

AMERICA'S MOST USEFUL ENGINEERING MAGAZINE

HIGHWAY ENGINEERS! Get the facts now for laying a test RUBBER ROAD in 1953



RECENT RUBBER ROAD INSTALLATION at a busy intersection in Los Angeles. Standard equipment and laying methods are used in laying natural rubber-asphalt paving.

Natural Rubber Bureau Offers Technical Data and Engineering Help

With the biggest road-building year in U. S. history expected in 1953, highway engineers all over the country are making plans now to lay stretches of natural rubber-asphalt road during this paving season.

Since 1949, roads incorporating natural rubber powder have been laid in 17 states. Highway engineers are enthusiastic about results to date. Indications are that natural rubber powder, mixed with asphalt, will give longer life to roads, reduce repair costs, and stretch highway dollars.

This year, for the first time, natural rubber powder is available on a commercial scale for road-building purposes, and it is expected that the demand will be large.

Expert technical assistance is available without cost or obligation from the Natural Rubber Bureau Research Laboratory. You can obtain full information about rubber roads—tests to date, methods of laying, and sources of natural rubber powder—simply by filling out this coupon and sending it to the Natural Rubber Bureau. Our staff of experienced highway engineers will be happy to help you.

Write today to the

Natural Rubber Bureau

1631 K STREET, N. W., WASHINGTON 6, D. C.

Natural Rubber Bureau Research Laboratory
Rosslyn, Virginia

WRITE TODAY FOR INFORMATION

NATURAL RUBBER BUREAU

1631 K Street, N. W., Washington 6, D. C.

With no obligation, please send me engineering data for laying a test strip of natural rubber-asphalt pavement as follows:

1. Length of proposed test strip miles

Width of proposed test strip feet

2. New Construction ☐ Resurfacing ☐

PLANT MIX

Type: Hot ☐ Cold ☐

Grade of Asphalt.....

Penetration.....

Depth of Top Course inches

Aggregate Content.....%

Aggregate Top Size.....%

Bitumen Content.....%

SURFACE TREATMENT

Grade of Bitumen.....

Application Rate.....gals. per sq. yd.

COVER MATERIAL

Type of Aggregate.....

Size of Aggregate.....

Lbs. per sq. yd.....

Name.....

Title.....

Dept.....

Address.....

City..... State.....

☐ Please send booklet "STRETCHING HIGHWAY DOLLARS WITH RUBBER ROADS"

☐ Please send information about new 30-minute motion picture on rubber roads

THE EDITOR'S POINT OF VIEW



Another Forward Step for Serving Public Works' Readers Better

AS announced more fully on another page of this issue, George E. Martin has joined the editorial staff of PUBLIC WORKS as advisor and consultant in street and highway engineering matters. To those who know him—and most of the leading engineers in the highway field know him very well—nothing further needs to be said. To those who do not know him, we will say that we think you are going to enjoy him very much, and you are also going to learn a lot of highway engineering in an easy and pleasurable manner. He knows his subject extremely well, he writes easily and clearly and he has a fine sense of humor. He is going to fit well into our organization and he is going to add greatly to its value through the provision of an unusual degree of engineering leadership.

"Please Discontinue Your Magazine—It Distracts My Office Staff."

BELIEVE it or not, that was the essence of a letter the editor received the other day. We are not surprised that the office staff likes to read Public Works, but we are surprised that an engineer should complain when his assistants try to improve themselves in engineering. In our many years of service in this engineering field, we have had the good fortune to work under men for whom it was never too much trouble to help and to explain. Time was always available for personal assistance and advice.

Yet we do not wish to judge too quickly. For an engineer with an inadequate staff—and who has enough engineers these days?—and a mounting volume of work, anything that distracts the staff may be like the well-known red flag to the equally well-known bull. We get that way ourselves now and then.

We're for More of this Kind of Business

OUT at the American Public Health Association Convention, the Sanitary Engineering Section presented a plaque to William J. Orchard, who for twenty-five years has been a real leader of that group. This is fine, but we think this country owes him more. Mr. Orchard is an outstanding engineer, but he is the fortunate possessor of

abilities that extend far beyond the scope of sanitary engineering. We would like to have seen action beyond the scope of the Association, and in keeping with the broad-gauge, nation-wide accomplishments which Mr. Orchard has made. No doubt it is difficult for a technical association to do such a thing, yet we ought to find a way to acknowledge the overall value of the services of such men.

We have carped quite often at the engineering profession for being derelict in acclaiming its members, and in doing almost nothing to present their accomplishments to the nation. What we here at Public Works feel is shown by the pictures on our front covers; but that isn't enough either. It will take a united effort on the part of engineers to do full justice to its many outstanding members.

It Looks Like 1953 May be Moving Time for Some

IN the wake of the 1952 elections, which brought many new faces into office, it seems likely that 1953 will see a considerable change in city, county and state personnel. Elective officials will be affected primarily but, unfortunately, there may also be some changes among the professional personnel responsible for operating and maintaining our important public works programs and installations.

First of all, we want to say that if Public Works can help any of these individuals, it will be glad to do so. Fortunately, at this time there is a serious shortage of technical and professional personnel in almost every community, so that local openings often or usually will be available. But where Public Works can help, such help will be given freely.

The editorial program for the coming year has been planned with three things in mind: (1) To present material that engineers and superintendents can use to orient newly elected officials to the scope and importance of a sound public works program; (2) to provide for incoming professional men the best and most useful information on needed new projects and on methods, equipment and materials; and (3) to furnish programs which can be used for the training of personnel in some of the fields of city, county and state public works maintenance operation and construction.

SPREADS AND COMPACTS REFUSE. International power behind the specially curved Drott Bullclam crushes and irons out all types of refuse. North Dakota's 18-story capitol building appears in background.



Bismarck, N.D., buries

International Crawler-Drott Bullclam unit does complete sanitary landfill job year around in one of nation's coldest cities

BULLCLAM BY



DROTT

POWER BY



INTERNATIONAL

POWER THAT PAYS

Health officials in the nation's northern cities who were concerned about whether the sanitary landfill method of garbage disposal could be applied in extremely cold weather got the answers they were seeking when reports were all in from Bismarck, North Dakota, last winter.

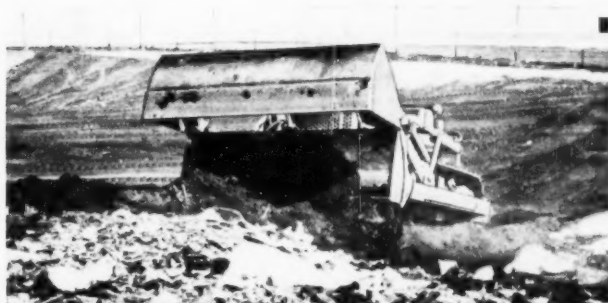
Bismarck, which is frequently the coldest city in the country with temperatures as low as 36° below zero, buries its garbage with the sanitary landfill method all winter long using a Drott Bullclam powered by a rugged red International TD-14A crawler.

City engineer E. J. Booth gives the low-down: "When we switched to the sanitary landfill

Get full details of this month's new products . . . mail your Readers' Service card today.



TRANSPORTS AND SPREADS EARTH COVER. Six-inch layer of dirt is placed over compacted refuse on face of long 30° ramp as intermediate seal of garbage cell.



COMPLETING COVER COAT. The "one-man sanitation squad" is shown extending the six-inch layer of dirt to the top of the ramp to complete the intermediate cover. Entire ramp area, 800 feet, is filled in 80-foot sections by sanitary landfill method.



GRADES AND LEVELS FINISHED AREA. Top of the ramp is shown being finished to grade elevation with 1.5 to 2 feet of dirt providing the final cover. Fill is smoothed and compacted until wasteland becomes possible future park site for 21,000 residents.

garbage at 36° below

method on April 15, 1951, we were apprehensive about operating 12 months of the year because of the unusually low temperatures here each winter.

"But with the sandy loam type of soil and heated storage for our International-Drott equipment, which never failed us, we never missed a day.

"It's difficult to believe that a smoking, rat-infested, odorous dump ever existed here. Rats have been completely eliminated and the stifling stench of burning garbage that used to plague residents of Bismarck is only a memory.

"We were never certain that the sewer rats which used to burrow upwards out of our sewers and cause big cave-ins along our boulevards came

from the old city dump, but we haven't had any such trouble since adopting the sanitary landfill method of handling garbage.

"Performance and cost of operating our equipment have been very satisfactory. We spend \$1,200 a year on operating costs for the International-Drott unit and dispose of 21,840 tons of garbage. Outside of a fan belt and a couple of other similar parts, we haven't spent a cent in maintenance on the equipment."

It's a one-man wonder! Ask your International Industrial Distributor for details on the only equipment specifically designed to do all four steps of the sanitary fill job.

FOR REPAIRING BELL AND SPIGOT JOINT LEAKS...

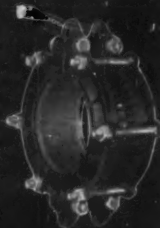


SKINNER-SEAL
Bell Joint Clamp for
stopping bell and
spigot joint leaks
under pressure. Gas-
ket is completely
sealed: at bell face
by Monel Metal Seal
band—at spigot by
hard vulcanized
gasket tip.

AND BROKEN MAINS

SKINNER-SEAL

Split Coupling
Clamp. One man
can install in 5 to
15 minutes. Gasket
sealed by Monel
band. Tested to
800 lbs. line pres-
sure. A lasting re-
pair. 2" to 16" incl.



M. B. SKINNER CO.
SOUTH BEND 21, INDIANA, U.S.A.

- CONSTRUCTION
CASTINGS
- MANHOLE COVERS
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tion Projects

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Chicago Office
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Chicago, Illinois

UP FRONT FOR ADEQUATE ROADS

BY
LEO J. RITTER, JR.



Useful Information: Owners and operators of a crane, shovel or dragline will be interested in a new publication of the Bucyrus-Erie Company, South Milwaukee, Wisconsin. Entitled "Ways to Make Your Excavator Work Harder—Live Longer", this attractive little booklet is full of useful information about proper operating procedures, basic maintenance, lubrication and machinery adjustments.

Everyone concerned with dirt-moving will find much valuable information in an article in the October-November issue of the "Le Tourneau Co-Operator", published by R. G. LeTourneau, Inc., Peoria, Illinois—"Ten Ways to Cut Cycle Time".

Why not write for these publications? They are free for the asking.

Local Road Administration: Comparatively few people realize the tremendous mileage of roads and streets in this country which are under the jurisdiction of local authorities: nearly 2½ million miles of highways fall in this category. Proper administration of these vital links in our highway transportation system is of great concern to all of us.

Many newly elected local officials are taking office this spring in all sections of the country. Now is a good time to take another close look at our local road practices, particularly at the county level. We are great believers in the county-unit plan of operation; this means that, as far as road matters are concerned, at least, the county is operated as a unit rather than on the basis of separate commissioners' districts or precincts, each with its own funds, personnel and equipment. For the average county the unit plan of operation is the most efficient possible—it results in a more capable organization, better and more uniform standards of

planning, design, construction and maintenance, and a more equitable distribution of tax funds. A unit organization also usually is in better condition to cooperate with state and federal highway agencies, a "must" in these days of increased federal-aid funds for secondary roads.

Now is the time, too, to take a sharp look at your county road organization to see if your administrative policies and practices are really up-to-date. Do you have a capable, experienced engineer on your payroll? If you don't you should have and he should be responsible for virtually all management functions. If your budget won't let you hire an engineer at today's prices, maybe you can work out a cooperative deal with one or two neighboring counties to obtain the engineering services you need. Do you prepare plans and specifications for contract work? Keep adequate and uniform records—particularly cost records—to aid you in management and planning? Use uniform accounting practices? And do you have a central purchasing agent who uses standard specifications for purchasing?

These things are all a part of good, sound business practice in the administration of your local road affairs. Proper application of them means that your people will get the greatest possible return from their tax dollars.

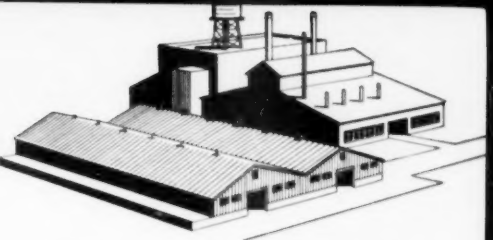
Don't Let this Opportunity Go By:

Probably by now everybody knows about the big General Motors Better Highways Award Contest, but we can't resist the temptation to put in our two-bits' worth about it. This is the first time in the memory of the writer that any really worthwhile competition has been held in the highway field—the top prize is 25,000 bucks and there is a total of \$194,000 in national, regional and state awards. Practically anyone can enter and you don't have to
(Continued on page 96)

FROM TOOL SHED



TO POWER PLANT . . .

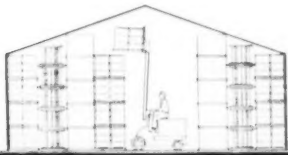


Butler Buildings Are Your Low Cost Answer to Nearly Every Public Works Building Need!

Chances are you've seen the Butler trademark on many a public works building . . . tool shed, garage, control shack, airplane hangar, warehouse or repair shop. Ever wondered why Butler Buildings make sense to so many municipal officials, engineers and contractors? Let's get down to brass tacks reasons. They might well save you a lot of time and money in *your* operation.

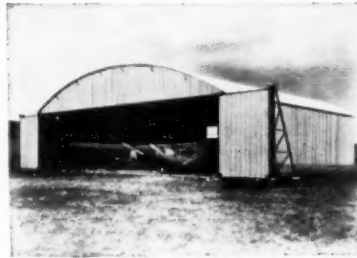
First, of course, is lower cost—Butler Buildings save you up to 50% of the cost of conventional construction. Erection costs are low. No painting or repairs needed. And you save through lower insurance rates.

Now, take a look at the drawing. It shows how the straight sidewalls and trussclear construction of Butler rigid frame buildings means *you* get



and use all the space you pay for. Those frames are engineered for greatest strength per pound of steel, too.

Butler Buildings are easily adapted to nearly every public works appli-



cation. For example, here's a Butler building serving as a civilian airplane hangar in Illinois. Butler Rigid Frame or Bow String Buildings are available in many widths from 20 to 100 feet or wider, with variable lengths. Various window, door, side and endwall arrangements are available. They're easily insulated with low cost materials. Here's how you can combine three Butler Buildings for larger power or sewage plant installations and design the exterior any way you like—it's a Naval Armory in Texas.



Also mighty important for you to know is that Butler Buildings, with

galvanized or aluminum covering, are *permanent* buildings (we know of many 40 years old and still in daily service!) which can be easily *dismantled* and *moved* with virtually no added expense.

Here's just a partial list of the many uses for these adaptable buildings:

- Airplane hangars*
- Bus or trolley depots*
- Filtration plant main or auxiliary buildings*
- Garages*
- Highway equipment shelters*
- Office buildings*
- Power plant main or auxiliary buildings*
- Pumping stations*
- Radio transmitter shacks*
- Sewage plant work sheds, control shacks*
- Tool sheds*
- Warehouses*
- Weighing stations*

You can hardly name an application for which Butler Buildings won't fill the bill and save you up to 50%. Your local Butler dealer will give you prompt, complete planning and erection service on your Butler Building. See him soon!

Straight Sidewalls . . . Get All the Space You Pay For

LET'S TALK IT OVER!

You're under no obligation whatever when you take the next logical step and ask for complete information. We'll be happy to talk over with you a low cost solution to your building problem. Don't wait. Get the whole story on Butler Buildings. Mail coupon right now!

KANSAS CITY, MO.
Birmingham, Ala. — Richmond, Calif.
Galesburg, Ill. — Minneapolis, Minn.



OIL EQUIPMENT — STEEL BUILDINGS
FARM EQUIPMENT — CLEANERS' EQUIPMENT
SPECIAL PRODUCTS

For prompt reply, address office nearest you:

BUTLER MANUFACTURING COMPANY
7321 East 13th St., Kansas City 26, Missouri
921A Sixth Ave., S.E., Minneapolis 14, Minnesota
Dept. 21A, Richmond, California

- ☐ Send name of my nearest local Butler dealer
- ☐ Please send complete information on Butler Buildings for use as _____

Name _____
Firm _____
Address _____
City _____ Zone _____ State _____

*This message first appeared in January 1952
We consider it just as important today*

WHAT'S A WHOLESALER?

At the end of every production line rises the greatest single responsibility of business—the profitable distribution of a product. So important is this responsibility that men all over the world dedicate their minds, money, voices, hands, eyes, ears, noses, nerves, and sometimes their very lives to its fulfillment.

As a group these men are termed "Salesmen", "Representatives", "Agents" and "Reps". They are called other things frequently.

So intent are they on marketing their products successfully, and so dire are the consequences if they don't, that they solicit the help of one of the most singularly important influences in the distribution cycle—the wholesaler.

The wholesaler has been known as a "Jobber", "Distributor", "Dealer" and smiles more often when called a wholesaler than by any other name.

He is linked to reputable manufacturers by supply, to their salesmen by merchandising, to his family by love, his employees by loyalty and to his customers by outstanding service and friendship.

He places more orders, receives more merchandise in greater variety, stocks and restocks more shelves, makes more shipments in less time, holds more confidences and credit across longer counters with a larger capital investment in a smaller area than does either his suppliers or his customers.

Every day he dispenses more information on a wider variety of products than is provided in the literature furnished him. It is taken from years of experience and is added to the knowledge of the craftsmen who are his customers.

The wholesaler can be counted among the members of leading associations, civic groups, fraternal orders, religious societies, country clubs and bowling leagues. His divergent interests compel him to be up early and out late. His favorite but rare relaxations are found at home, on vacation, with a fishing rod or behind a bird dog; at a card table and over a cup of coffee with Joe around the corner.

The wholesaler is not typically a small businessman, neither is he a tycoon; rather, he is a well established, highly regarded commercial institution; sincere, practical, reliable; and on his shoulders rests the production lines of tomorrow—profitable distribution today.



**BUY FROM YOUR
WHOLESALE**



WOLVERINE TUBE DIVISION,
of Calumet & Hecla, Inc., *Manufacturers*
of tubing exclusively, 1451 Central
Avenue, Detroit 9, Michigan. Plants in
Detroit, Michigan and Decatur, Alabama.

Owners' pride... Operators' delight the **NEW OLIVER "OC-18"**

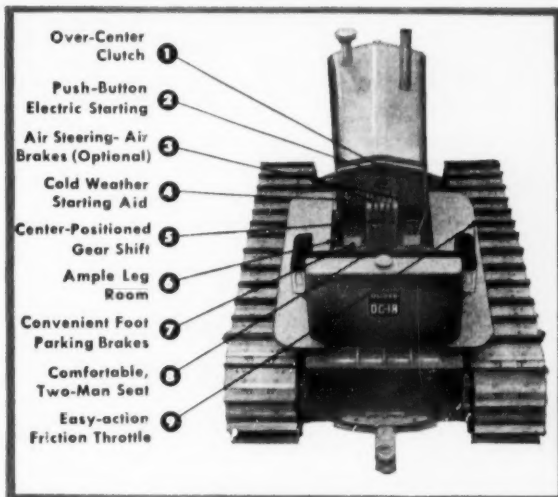


OWNERS can't say enough good things about the new Oliver "OC-18." They keep telling us how it does more work... how that full 133* drawbar horsepower gives it plenty of power for the really tough jobs... about its low operating and maintenance costs... and how the operators and mechanics like it.

OPERATORS are even more enthusiastic. It's the first big tractor they've found that is designed to make life easier for them. They tell us that toward the end of a long day on the "OC-18," they are much less fatigued, much more fit to continue giving top performance. The illustration shows clearly the 9 important "easy operating" features of the "OC-18." No other tractor boasts all these. They make the "OC-18" "the operators' dream come true."

Ask your Oliver Industrial Distributor to arrange a demonstration. Or if you prefer, write to The Oliver Corporation, 400 W. Madison St., Chicago, Illinois.

*OFFICIAL NEBRASKA TEST NO. 489



THE OLIVER CORPORATION

400 West Madison Street, Chicago 6, Ill.



A complete line of industrial wheel  and crawler tractors

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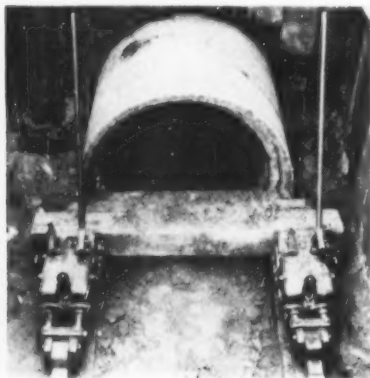
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Write today for descriptive literature. Greenlee Tool Co., 2041 Columbia Avenue, Rockford, Illinois, U.S.A.

People, Ideas and Events

BY "DOC" SYMONS



H.T.M.A. — And let me be among the many "first to wish you the best of everything for the whole year of 1953."

* * *

In last month's column, I listed the various non-professional organizations to which I belong, but I neglected to include "The NOBD", or in full, "The Nimble Order of Bum Digits", a group which I organized some years ago to underscore the importance of safety. All of our members are "horrible" examples of what happens when one strays outside the rules of safety. Prime requisite for membership in The NOBD is to have lost, by accident, at least some part of one or more fingers or thumbs. If you are eligible, please furnish me with documentary evidence in the form of an outline of the hand.

Motto of the NOBD is "Safety Is No Accident". Honorary Member is Ray J. Faust, Exec. Asst. Secy. of AWWA, not because he is short some part of a digit, but because of his interest in furthering safety programs among water works operators.

* * *

What's-In-A-Name — A couple of years ago, at the joint meeting of the New York-New England Sew. and Ind. Was. Assns., I conducted a forum discussion. One of the speakers was John Szymanski, Supt. of Sew. Treat., New Britain, Conn.

As a gag, I introduced John as my Polish cousin.—John doubled me in spades; he told how, when he had played football for Fordham University in New York City, the coach had said, "These newspaper men can't spell your name, so from now on your name is 'Symons'."—Maybe he is my cousin?

* * *

Speed Demons ??? — This item belongs in Prof. Leo Ritter's Column on "Adequate Roads".—

I was driving home from the 71st Annual Meeting of the NEWWA

at Groton, Conn., where L. F. Dutton is Supt. of Utilities, and while cruising down the Parkway in Connecticut, I decided to determine just how well autoists obey the speed limits. In that particular section, the limit is 55 mph and for 40 minutes I drove as nearly at 60 mph as I could hold it. During the 40 minute period, I travelled 36 miles at an average of 54 mph. In that period, I passed 27 cars, but 36 cars passed me. According to my calculations—more than 57 per cent of the drivers (on that highway, at least) travel at speeds of more than 5 miles an hour above the speed limit.—How about it, Prof Ritter, should speed limits go up?

* * *

Luminous Quote — A professor I once knew, said, "There is nothing in the Constitution of the United States that requires anyone to be dumb."

* * *

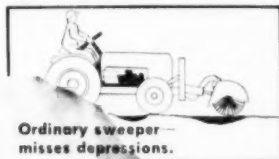
It's An Idea? — Too many persons in municipal administrations don't understand research aims and accomplishments. Still less do they understand that it is often necessary to have many ideas and experiments underway while only one may turn out to be successful. For this reason they are opposed to spending money on research. Thus the potentials of good municipal water and sewage works laboratories and of the clever men who operate them are lost. Perhaps some industries are likewise uninformed and unappreciative of the importance of research. For the uninitiated, I'd like to say that if just one idea in ten turns out to be productive, research pays off.

* * *

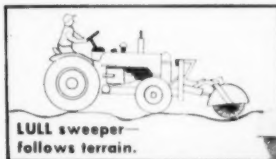
I Read Somewhere — That John Stewart, Manager of the Water & Sewage Works Manufacturers Assn., asked Harry Jordan, AWWA Secy., how come the 1908 AWWA Convention program said, "27th (Continued on page 101)

ROUGH TERRAIN! no longer a problem with the AUTOMATIC TERRAIN COMPENSATOR on LULL Fluid Driven SUPER SWEEPERS

The ordinary sweeper with no terrain compensator passes directly over ground depressions or excessively wears the brush on sharp grades . . . but a Lull Sweeper with an AUTOMATIC TERRAIN COMPENSATOR always maintains a constant broom-ground pressure. Insures a clean sweep of all surfaces on the first trip and no excessive wear of the brush.



Ordinary sweeper—misses depressions.



LULL sweeper—follows terrain.

Get a FASTER and CLEANER sweep with a Lull Super Sweeper and have more time to do those other necessary maintenance jobs. No more time lost by operator stopping to make adjustments. Convenient hydraulic finger-tip controls start and stop broom rotation—regulate broom speed—raise and lower broom to exact desired height. Without even stopping the tractor, you can change the broom angle from 35° left to 35° right.

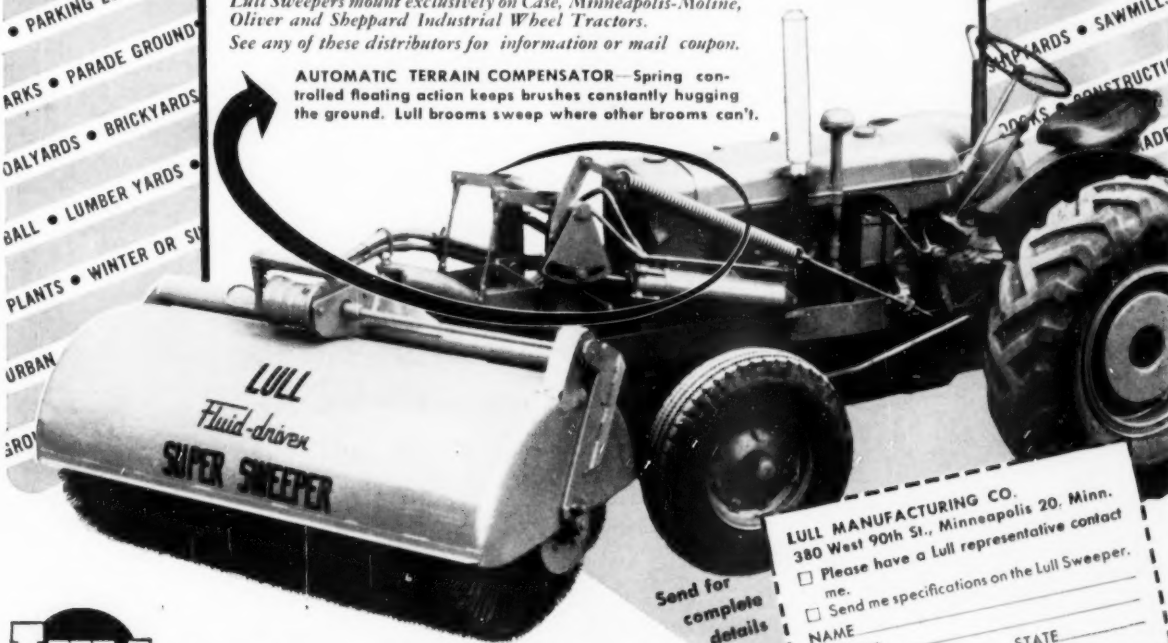
Brooms are available in 5', 6', or 7' lengths with Palmyra or Stainless Steel bristles. Lull dust shields and Lull snow shields are also available. Easily interchangeable brooms do any sweeping job. Make your Lull Sweeper an all year round money maker.

Lull Standard Sweepers are available without automatic angle change, but with all of Lull's other fine features.

Lull Sweepers mount exclusively on Case, Minneapolis-Moline, Oliver and Sheppard Industrial Wheel Tractors.

See any of these distributors for information or mail coupon.

AUTOMATIC TERRAIN COMPENSATOR—Spring controlled floating action keeps brushes constantly hugging the ground. Lull brooms sweep where other brooms can't.



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☐ Please have a Lull representative contact me.

☐ Send me specifications on the Lull Sweeper.

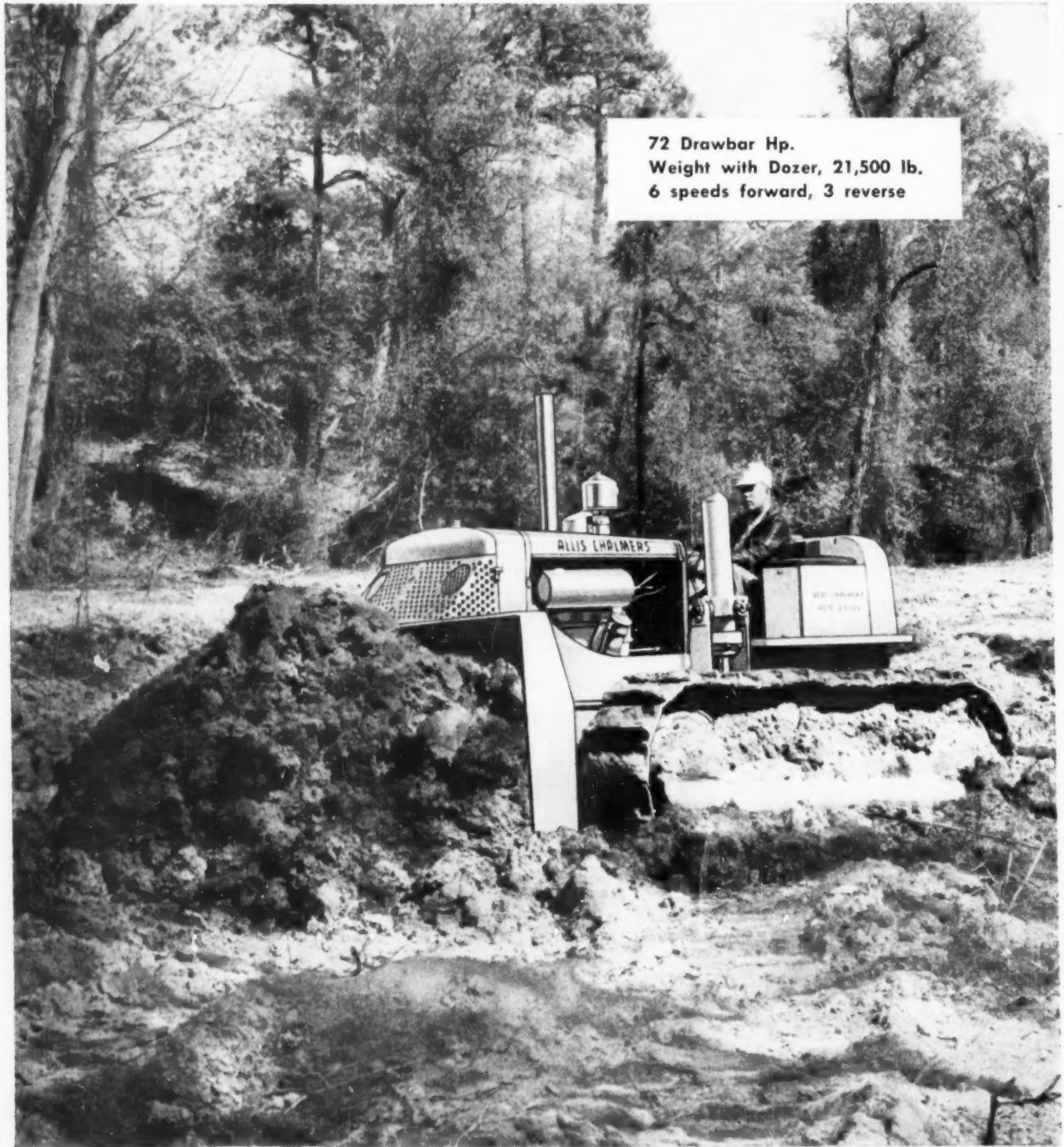
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Here's a Big Advance in Bulldozing



72 Drawbar Hp.
Weight with Dozer, 21,500 lb.
6 speeds forward, 3 reverse

Performance

Allis-Chalmers HD-9 Tractor with new 9X no push-beam dozer represents major design improvement

This bulldozing team introduces new dirt-moving ability; a new, narrower-width blade for transporting by highway; new ease of servicing and operation — all at a new low cost.

Here are some specific characteristics that make it such a productive combination for many dozing jobs:

A great tractor. This popular Allis-Chalmers HD-9 Tractor has power, weight and balance that put it in a class by itself.

A revolutionary team. Here is a tractor-dozer combination, designed as a unit, which compares in performance with conventional "dozers" weighing from five to six thousand pounds more.

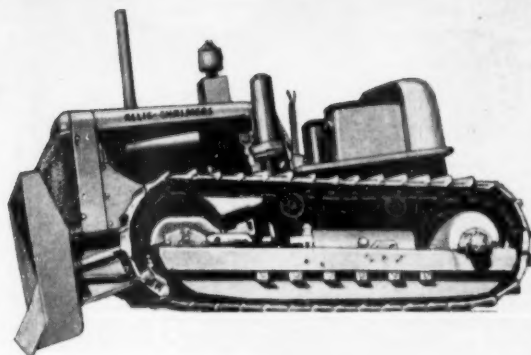
No push-beams. A completely new idea in bulldozer engineering, the Baker 9X blade is mounted directly to the HD-9 main frame. Tractor main frame and dozer are raised and lowered as a single unit.

Lighter weight — better stability. Almost 1,150 lb. lighter than standard dozer. Costs less to buy. And with lighter blade mounted 15 inches closer, tractor center of gravity is not upset. No excess wear on front truck wheels and support rollers.

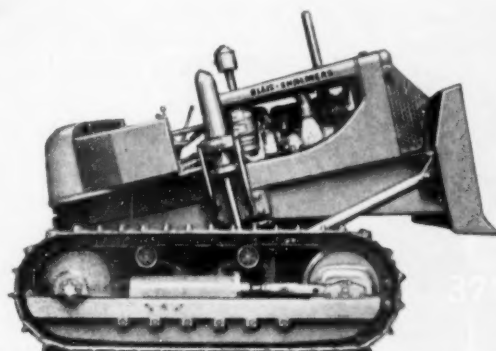
Big dirt mover. Because of extra clearance, greatly increased track oscillation and better balance, this team is a phenomenal performer in mud and tough going. And with blade fully six inches higher, capacity is kept on par with conventional blade.

Simplified servicing. 1,000-hour lubrication of truck wheels, idlers and support rollers. Dozer mounting does not interfere with engine accessibility. No removal of major tractor assemblies.

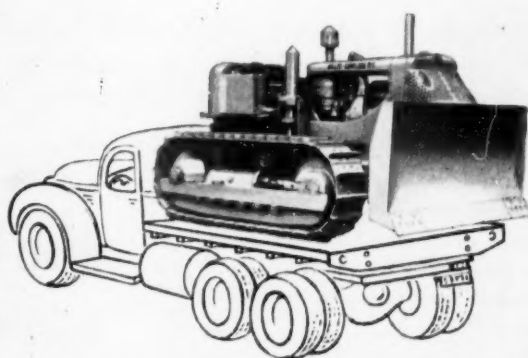
Easy to operate. Just by pulling a single lever, operator can shift from any of the six forward speeds to any of the three high-speed reverses. This, plus narrow, frame-mounted blade, makes the HD-9 particularly fast and maneuverable.



BITES DOWN HARD. Full 13-in. drop below ground, positive down pressure plus steep angle of penetration mean fast digging.



HIGH LIFT. Full 37 in. above ground. Excellent for pushing over trees and stumps and clearing brush.

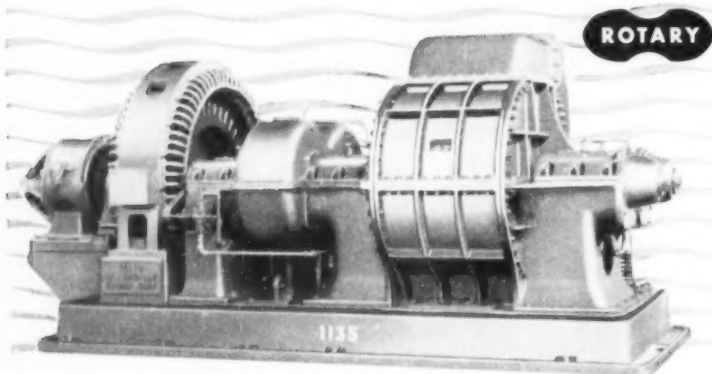
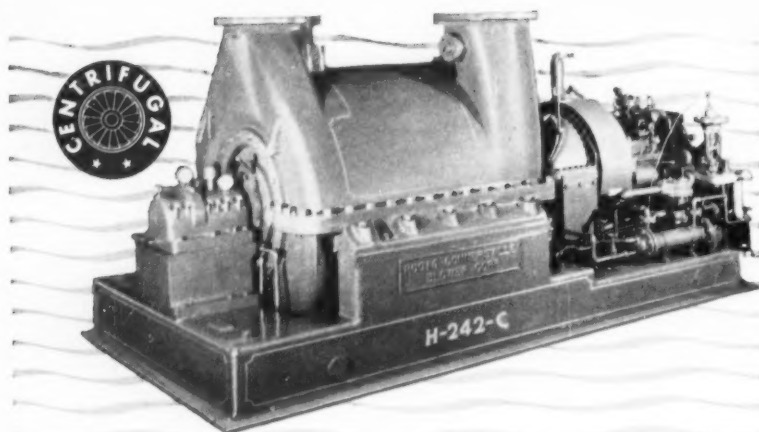


EASIER HIGHWAY TRANSPORT. Blade is only 8 ft. wide — no transport permit needed.

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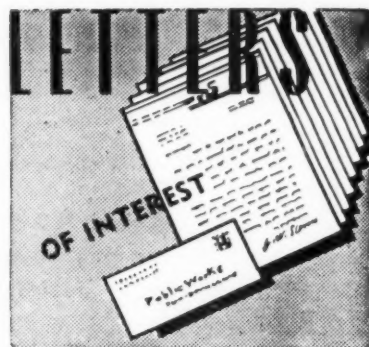
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FRONT-COVER PICTURE

Thanks for the half-tone plate of my picture, which arrived late this morning. I enclose a page from yesterday's local paper which may be of interest to you. Your circulation must be quite complete as I have now received nice notes from about twenty states.

Howard R. Green,
Consulting Engineer,
Cedar Rapids, Iowa.

DOWN INTO THE SEA

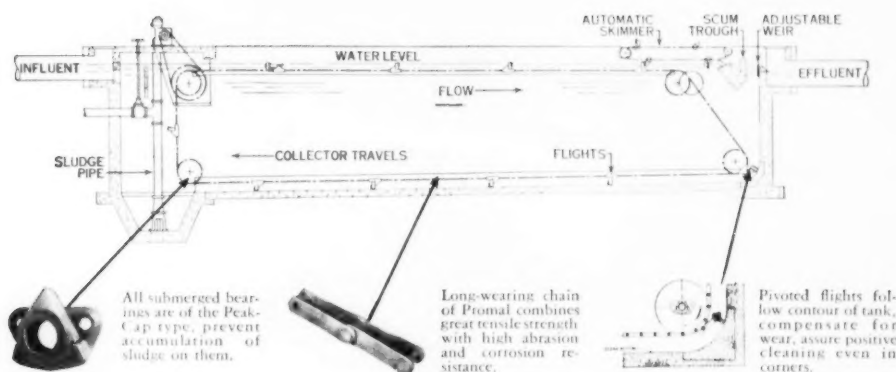
The diving (see the article last month on "Inspecting an Ocean Outfall") so intrigued me that I checked out in the decompression chamber to see if my ears would adjust with pressure changes, and then descended into 45 ft. of water to observe the pipe firsthand. The experience was one of those best described as "the thrill of a lifetime."

With the diving gear on, it is almost impossible to walk on the deck of the boat, but when you enter the water you lose the sense of weight and are much lighter than normal. This is a disadvantage when hammering or otherwise working, unless one learns to hit the chin button, located inside the helmet, with the chin, thereby deflating the suit and increasing your weight.

Visibility is limited to four small windows. The front one quickly fogs from your breath and the side or top ports are the only ones through which you can see, unless you learn to wipe the front port clear with your chin. The view through the glass ports is indescribably beautiful and unreal, like being in a new and vastly different world. Kelp forests wave gently back and forth. Fish swim in and out of view, with some coming close to peer in the windows of the helmet, apparently to see what

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Easy, economical sludge removal provided for water and industrial waste treatment plants

Since the first Straightline Sludge Collector went into service at Gastonia, N. C., in 1921, the great majority of the country's rectangular settling tanks have been equipped with this Link-Belt design. Straightline action provides the shortest possible travel of collected material at slow, uniform speed. Result: minimum disturbance of flow and maximum efficiency. In addition, they have a proven record for uninterrupted operation with minimum attention.

Straightline Collectors are part of the complete Link-Belt line of quality equipment. Our sanitary engineers will be glad to work with your engineers, chemists and consultants—help you get the best in modern water, sewage or industrial liquids treatment equipment.

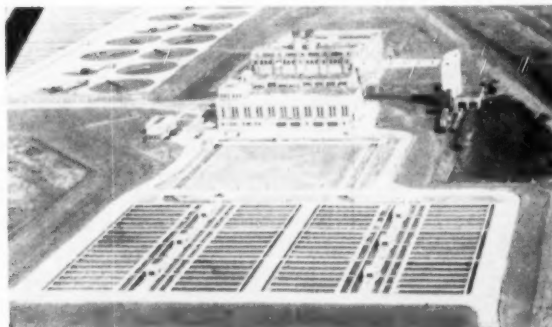
LINK-BELT

SANITARY ENGINEERING EQUIPMENT

LINK-BELT COMPANY: Plants: Chicago, Indianapolis, Philadelphia, Atlanta, Houston, Minneapolis, San Francisco, Los Angeles, Seattle, Toronto, Springs (South Africa), Sydney (Australia), Sales Offices in Principal Cities.

12,972

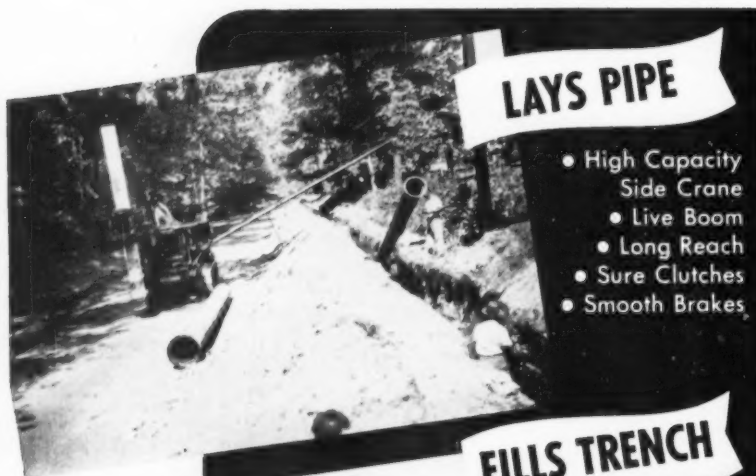
Straightline Collectors, for both primary and final settling tanks, equip plants from 80,000 up to 600,000,000 gpd. Shown here: a 600,000,000 gpd plant (left) and 6,000,000 gpd (right).



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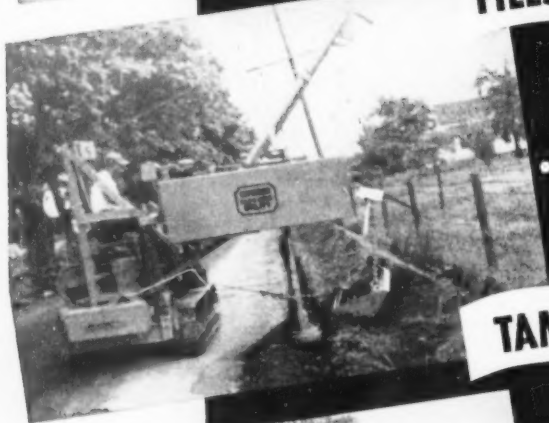
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PUBLIC WORKS for January, 1953

is invading their realm. Starfish and shellfish take on an iridescent beauty that disappointingly disappears when they are brought to the surface. Time goes by quickly, and it is with real disappointment that you return to the surface. Hoisting yourself up over the side of the boat brings into even sharper contrast the freedom from gravity that is felt on the bottom.

F. R. Bowerman,
Sanitary Engineer,
County Sanitation Districts,
Los Angeles Co., Calif.

NEEDS NEW EQUIPMENT

We, here in Florence, are confronted with a problem that probably plagues all cities of all sizes. We have a lot of equipment that was very good at one time, but is now out of date, and it is hard to see how we can replace some of this. For instance, we have a 1923 White truck, with a winch of undetermined age and origin on it. We use it quite a bit, but not enough to make it worth while replacing when we need so many other things so badly. And an old street flusher . . . which we expect to fall apart some day in the middle of Main Street.

Curtis E. Blyth,
City Manager,
Florence, Colo.

STREET WORK & PACKAGE PLANTS

Our city has no extra source of income, as from a municipal power plant, so its financial resources are limited. A street improvement district has been formed in which about five miles of streets have been constructed with a 6-inch soil-cement base and a 3/4-inch bituminous wearing surface. The job of building 10 miles of lip-curb and gutter is under way. Another improvement district has been formed and will build two or three miles of streets.

Our sewage treatment plant is antiquated. We are anticipating further residential expansion and are planning another sewage plant. In this line, we would appreciate information relative to pocket (or package) plants which can be used for housing projects or small subdivisions. We understand some types have been approved by State Health Departments.

J. H. Abbott,
Town Division Engineer,
Crossett, Ark.



HERE'S HOW LOAD-PACKER REFUSE COLLECTION CUTS COSTS MORE THAN 50% in a TYPICAL COMMUNITY

In many towns with 3,000 to 6,000 population, one Gar Wood LOAD-PACKER has replaced from three to five open-type trucks formerly used for municipal refuse collection. And, in larger towns and cities, equipment savings increase in even higher proportion.

For example, consider a typical American city of 6,000 people which would average about 1,600 dwellings. A single LOAD-PACKER with a crew of two loaders and a driver can service 800 dwellings each 8-hour day. Thus it's easy to maintain a schedule of one weekly residential garbage collection, one weekly trash and ash collection and daily garbage and trash collections at commercial establishments. One day each week, too, can be reserved for general or special clean-up jobs.

Under this easily maintained schedule, one LOAD-PACKER offers better service to residents than was previously possible with a minimum of three open trucks. And extra savings are assured since there is only one truck to maintain. Labor requirements are reduced and extra manpower is made available for street maintenance, sewer cleaning or other municipal assignments.

From small towns to the largest cities—in test after test—Gar Wood LOAD-PACKERS have consistently resulted in faster refuse collection schedules with lower operating costs. Now, put modern refuse collection to work in your community. Mail the coupon below for valuable free information about modernizing your refuse collection system—and cutting your collection costs—with new, modern Gar Wood LOAD-PACKERS.

GarWood LOAD-PACKERS SAVE EXTRA DOLLARS

EQUIPMENT PURCHASE COST

with open trucks



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1 Load-Packer

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6 to 9 men



3 men

FROM 50% TO 66% LESS

MAINTENANCE COST



3 trucks



1 Load-Packer

UP TO 66% LESS

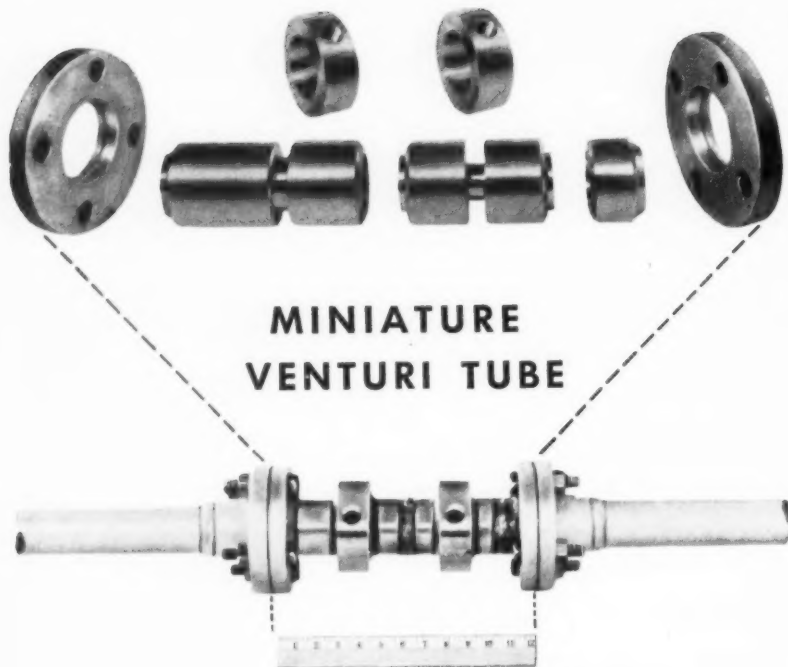


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WAYNE, MICHIGAN

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Please send me full information about the new Gar Wood LOAD-PACKERS.

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MINIATURE VENTURI TUBE

—SOLVES UNUSUAL PROBLEM

PROBLEM: Accurate measurement of low flow of a corrosive process liquid through 0.375" pipe. Fluid under 20 p.s.i. gauge pressure at 50° F., has a specific gravity of 1.32. Maximum flow 158.6 lbs. per hour.

SOLUTION: Ready-made measuring devices were reviewed—advantages and limitations of each type noted. No standard device available to measure low flow accurately under corrosive conditions.

Called in specialist in measuring problems—Simplex sales engineer—and outlined difficult requirements.

RESULTS: Simplex designed and produced a tailor-made Venturi tube of welded stainless steel that resists corrosion. Interesting device—may well be smallest in industrial process use—throat diameter only .105". Machining to .0005" tolerance provides specified accuracy. Unit is simple, reliable, efficient . . . and accurate.

Consult Simplex on measuring devices of unique sizes tailor-made for your special applications, small or large.

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LEADERS IN THE PUBLIC WORKS FIELD



Don E. Bloodgood, whose photograph appears on our front cover this month, is professor of Sanitary Engineering at Purdue University, Lafayette, Ind. Don has had a long and outstanding career in his chosen field of work. Starting with a BSCE degree from the University of Wisconsin in 1926 (and a CE degree in 1935), he was research chemist for the Milwaukee Sewerage Commission from 1926 to 1929; he was with the Indianapolis Sanitary District from 1929 to 1936; and Manager of Sewage and Garbage Disposal for Indianapolis until 1943, when he took the big step of going to Purdue.

In addition to teaching undergraduate and graduate courses in Sanitary Engineering, he is director of research in sanitary engineering and conducts extension activities. He has done a good deal of writing, with more than fifty published articles to his credit; and he is chairman of the Purdue Industrial Waste Conference—if you haven't gone to one, you should. Association memberships include ASCE, AWWA, FSIWA, APHA, CSSIA, IAS, ISPE, IEC, Sigma Xi, Chi Epsilon and IPHA. Also, a member of the University, Torch and Sciencetech Clubs; and the Sigma Pi Fraternity. And you'll find him in Who's Who in America.

Don and his wife Margaret have three children: Lt. Don A., now serving in the Far East; and twins, Thomas W. and Natalie Ann, both freshmen at Purdue. His hobbies? Clocks, genealogy—and work. And be sure to read what Doc Symons says in his column about Don.

Woo ooosh!



Here's the secret
This impeller has no blades to catch and
hold trash.

... and NO clogging!

Yes, fibrous material follows this path through a Fairbanks-Morse *Bladeless* Impeller Pump... just a "whoosh" and it's through without clogging. The secret to this truly non-clog pump is in the *bladeless* impeller—there are no blades or projections in this "whirling tube" to catch and hold trash... you really cut maintenance!

This Fairbanks-Morse pump has been thoroughly tested—even a man's complete coveralls went through a 4-inch pump without clogging! So check your Fairbanks-Morse Pump Distributor or Local Branch Office for the complete story on this *Bladeless* Impeller Pump... or write to Fairbanks, Morse & Co., Chicago 5, Illinois.



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Free EQUIPMENT DATA TO HELP YOUR PUBLIC WORKS PROGRAM

The engineering information in these helpful catalogs will aid you in Engineering and Public Works programs. Just circle numbers you want on the coupon or write the manufacturer direct and mention PUBLIC WORKS.

Sanitary Landfill Operation and Methods

28. The location and area requirements for sanitary landfill, operation methods for trench type and area fills, equipment selection and costs are items discussed in an 8-page booklet issued by Allis-Chalmers Mfg. Co., Milwaukee 1, Wis. Be sure you have this reference when considering the problem of garbage and refuse disposal. Check the handy coupon today.

Catalog Covers Complete Line of Adams Road Machinery

45. All machinery in the Adams line of road building and maintenance equipment is illustrated and described in an attractive catalog, Form 5110, issued by the J. D. Adams Mfg. Co., Indianapolis, Ind. Included are motor graders, self-propelled Traveler, pull type graders and accessories. Check coupon for your copy of this comprehensive booklet.

Blades For All Types Of Equipment

60. Get information now on long-wearing blades for graders, scrapers, bulldozers, snow plows and scoops; snow plow noses and runners; scarifier teeth and numerous other products for road machinery. Check coupon or write to Paper-Calumet & Co., St. Paul 8, Minn.

A Clean Sweep With Tractor-Mounted Sweeper

77. The Lull fluid drive "Super Sweeper" with automatic terrain compensator gives a clean sweep without excessive brush wear despite rough terrain. Finger-tip hydraulic controls regulate broom speed and angle. For full details write Lull Mfg. Co., 380 West 90th St., Minneapolis 20, Minn., or check the coupon.

Inexpensive Ditcher Handles Heavy Digging

91. The Shawnee Scout Ditcher, a new, heavier model for extensive digging has been added to the Shawnee line of ditchers and dozers. All models are designed to handle

ditching and backfilling operations quickly, efficiently and at low cost. Full information on this equipment will be sent by Shawnee Mfg. Co., 1947 N. Topeka, Topeka, Kans. Just check the coupon.

Booklet Helps Design of Custom-Engineered Steel Buildings



110. Custom-engineered Butler steel buildings are available in every size, type and design to meet your building needs. In a helpful 32-page booklet you will find details on several basic designs and an unlimited variety of door, window, interior treatments, answers to your questions on construction and erection, and many illustrations of typical uses. Use the coupon or write to Butler Mfg. Co., Kansas City, Mo.

Discussion of Ranney Method For Municipal Water Production

116. A very interesting study of municipal and industrial water supply problems and a complete discussion of Ranney Collectors for water production will be found in a 20-page booklet published by Ranney Method Water Supplies, Inc., Box 277, Columbus 9, Ohio. Water quality, construction methods, costs, performance and other topics are considered. Check the coupon to get your copy.

What You Should Know About Design and Use of Concrete Sewers

122. Every engineer and contractor should have a copy of the 48-page book "Concrete Sewers" in his library. This valuable text, published by the Portland Cement Assn., 33 W. Grand Ave., Chicago 33, Ill., gives an authoritative discussion of hydraulics, sewer design, construction and maintenance. Generous use of helpful illustrations makes the book attractive and helpful to the reader. For your copy, just check the handy coupon.

Makes Underground Pipe Installations Easy

115. One-man operated hydraulic pipe pusher pushes pipe through ground under streets, sidewalks, lawns and other obstacles. Pays for itself in man hours saved on first few jobs. For complete facts ask for Form E-214, Greenlee Tool Co., Rockford, Ill. Just check the coupon.

Complete Bulletin On Municipal Supplies

134. Everything from leak locators to street signs is listed in the big 100-page bulletin "Municipal Supplies" published by Darley. Hundreds of different items for all city departments are included. Get your copy of Bulletin No. 148 from W. S. Darley & Co., 2814 Washington Blvd., Chicago 12, Ill., by checking the coupon.

Instant Communications By Two-Way Radio

140. A new 8-page illustrated booklet, published by General Electric Co., Electronics Park, Syracuse, N. Y., discusses the use of two-way radio for better coordination of men, materials and machines. A wide variety of applications for maintenance and emergency services are considered. Check the coupon now to get attractive bulletin.

Automatic Control of Pumps, Valves and Other Devices

167. Pumps, valves, gates, alarms, indicators and other devices in water and sewage systems may be operated in coordinated sequence with Autocoon "Selectrols". A single float can control 2 to 18 circuits with the Type M unit. More details and typical installation data in Bulletin 3500, available from Automatic Control Co., St. Paul 4, Minn. Check the coupon.

Check the Features You Need In Motor Pick-Up Sweepers

199. Big hopper capacity for central dumping; full floating broom suspension; unobstructed vision for operator; trouble-free eleva-

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Name
 Occupation
 Street
 City State

THIS COUPON NO. 6006 A FEBRUARY 1953

tor; full front axle and rear wheel steering; big gutter broom; plenty of power; and standardized parts are Wayne Model 450. Get form 101 from Wayne Mfg. Co., Pomona, Calif. for all the details. Check coupon today.

Technical Data Guide on Rust Preventive Coating

205. Cutting the cost of rust prevention with Sonneborn S.R.P. (Sure Rust Prevention) coatings for interior and exterior surfaces is discussed in a new technical data guide. The functions of rust preventive coatings, performance test results and data on the use of S.R.P. are included. Get your copy by checking the coupon. L. Sonneborn Sons, Inc., 80 Eighth Ave., New York 11, N. Y.

How to Choose the Right Self-Priming Centrifugal Pump

212. Descriptive folders on the complete line of contractors' pumps have been issued by the Gorman-Rupp Co., Mansfield, Ohio. 2-in.



to 10-in. models are illustrated, performance tables are shown and pump selection tables are included to assist in choosing the proper pump for different jobs. Check coupon for your copies.

How to Reduce Refuse Collection Costs

123. The sequence of operations for fast loading and refuse compaction in the Gar Wood Load-Packer are illustrated and described in 12-page folder W-110, together with size data and details of hydraulic elements. Be sure to check all details of the efficient Load-Packer system. Check coupon or write Gar Wood Industries, Wayne Division, Wayne, Mich.

How to Detect Carbon Monoxide

105. For protection in tunnels, garages, power plants or wherever carbon monoxide threatens, a Tallor & Cooper carbon monoxide detector may be installed to warn of dangerous concentrations or automatically operate ventilation devices. Full details in Bulletin 201. Check coupon or write Tallor & Cooper, Inc., 75 Front St., Brooklyn 1, N. Y.

CONSTRUCTION EQUIPMENT AND MATERIALS

Municipalities Make Equipment Dollars Go Further

55. Be sure to get your copy of "Saving Facts" a new illustrated booklet prepared by The Oliver Corp. that shows how equipment dollars can be stretched on municipal work. Text and photos describe the application of tractors and money-saving attachments in street maintenance, snow removal, waste disposal, pipe laying and other projects. Write The Oliver Corp., Industrial Div., 400 W. Madison, Chicago, Ill. or check coupon.

3 to 5 Ton Tandem Roller Has Many Uses

84. The Galion Iron Works & Mfg. Co., Galion, Ohio, has just issued a catalog on their new model 3-5 ton Variable Weight Tandem Roller. The many improvements in construction and operation are fully described and illustrated. Get your copy of Catalog 360 by checking the coupon.



*It likes
the Big Pikes...*

On the punishing turnpike jobs, original equipment producers know their products will move inches, feet, yards or miles . . . thanks to a Shunk blade.

On a big, tough grader, 'dozer or scraper, the Shunk blade really likes the big pikes.

Highway construction and maintenance contractors look to a Shunk blade for endurance and long wear. They specify a Shunk for its superior quality.

Distributors everywhere know that their recommendation of a Shunk blade for turnpike jobs will be backed by Shunk service and reliability.

Put this rugged work horse to work on your next pike job. More information will be gladly provided.

3000 DIFFERENT SPECIFICATIONS



WRITE FOR OUR NEW CATALOG

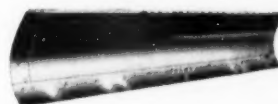
Shunk MANUFACTURING COMPANY
In Our 98th Year

BEST BLADES MADE

BUCYRUS, OHIO



GRADER BLADES



MOLD BOARDS



SCARIFYING BLADES

To order these helpful booklets check the coupon on page 24.

What Maintenance Do Your Tractors Need?

26. The life of your tractors depends largely on the maintenance you give them. Now you can get a four-color, cartoon style booklet that tells the basic methods for making Caterpillar Diesel Tractors last longer and do better work at lower cost. Operating instructions are simply explained and proper care of tractor components is shown. Get Form 30247 by checking the coupon. Caterpillar Tractor Co., Peoria 8, Ill.

What's Your Digging Problem?

Repair Work? Trenches? Footings?

35. At today's prices, hand digging means the job will be costly. You can dig through asphalt and macadam, work fast and efficiently even in cramped areas with the tractor mounted Sherman Power Digger. From one position you can reach to dig 10 feet behind tractor in 140° arc and to depth of 8 feet. For full details check the coupon. Sherman Products, Inc., Royal Oak, Mich.

Helpful Booklet on Carryable Centrifugal Pumps

129. A booklet prepared to give practical information that will guide you in choosing the best type of pump for your requirements is offered by the Homelite Corp. Both gasoline and electric models are discussed, and requirements outlined for many applications. Just check the coupon for your copy. The Homelite Corp., 2125 Riverdale Ave., Port Chester, N. Y.

Air Cooled Engines for Hundreds of Applications

137. Tested under severest conditions of long, hard use, these engines have earned world wide recognition as the "right" power of hundreds of applications. Get latest bulletin from Dept. P.W., Briggs and Stratton Corp., Milwaukee 1, Wis.

Black-Top Paver Offers Many Advantages

150. The flexible Adum Black Top Paver lays any asphalt mix, hot or cold, in

widths from 6 ft. to 13 ft. Careful design lowers operating cost and cuts maintenance. Attachments spread stone, cinders or slag. Get full data on this machine by checking coupon. The Foote Co., 1954 State St., Nunda, N. Y.

Trenching Made Easy With Hydraulic Dragshovel

216. The Bucyrus-Erie "Hydro-hoe", a completely hydraulic dragshovel has two separate digging actions to dig a level, scallop-free trench and greatly reduce hand trimming. Be sure to investigate this rugged, easily operated machine. For details write Bucyrus-Erie, Hydrocrane Div., So. Milwaukee, Wis., or check the handy coupon.

Get Tough Blades and Cutting Edges For Your Construction Equipment

221. Controlled analysis steels used in Shunk blades and cutting edges for graders, scrapers, dozers, and snow plows mean long life and wear resistance to give you more value for your maintenance dollar. Full data for ordering blades and swarther teeth for standard and special equipment is available from Shunk Mfg. Co., Bucyrus, Ohio. Check the coupon today.

Profitable Construction with Payloader

234. A comprehensive, 12-page catalog filled with on-the-job photos showing a wide variety of earth-moving, material-handling, lifting and carrying jobs being performed by the multi-purpose tractor-shovels known as "Payloaders" is now available. Helpful job data, specifications and features of the complete Payloader line are included, with illustrations of useful accessories. Copies of this colorful catalog No. 217 can be obtained from The Frank G. Hough Co., 761 Sunnyside Ave., Libertyville, Ill., or by checking the coupon.

Choosing Trucks For Municipal Service

264. For all municipal services, trucks are needed that are high in efficiency and economy. Be sure to investigate the White 3000, engineered for high performance. Full details on White Super Power trucks from the White Motor Company, Cleveland 1, Ohio

Gunitite Costs Less On Repair Jobs

255. Be sure to investigate Gunitite for repair of reservoirs, dams, water and sewage plant tanks, sewers, swimming pools, etc. Contact Eastern Gunitite Co., Elkins Park, Pa. for full information, or use coupon.

REFUSE COLLECTION AND DISPOSAL

Efficient Material Handling to Reduce Incineration Costs

130. Blaw-Knox Buckets specially designed for refuse and garbage handling are described in 22-page Bulletin 2350. Illustrations show progress of material through a modern municipal incinerator plant. Dimensions and incinerator bucket specifications are included. Blaw-Knox Div., 2124 Farmers Bank Bldg., Pittsburgh 22, Pa.

Increasing the Efficiency of Bulk Rubbish Collection

177. Strategically spotted bulk containers can be handled by one man operating a Dempster-Dumpster equipped truck. Get full details of this cost-saving system of rubbish collection, as used by many cities to increase efficiency and eliminate unsanitary conditions. Write Dempster Brothers, Inc., 952 Dempster Bldg., Knoxville 17, Tenn., or use the handy coupon.

How to Build and Operate A Sanitary Fill

146. A complete discussion of many types of sanitary fill construction, together with cost data from communities of all sizes, is offered by the Drott Mfg. Corp. Get this valuable presentation on the Drott Bulclam and International Crawler tractor combination, specially designed for all phases of sanitary fill work, by checking the handy coupon, or write Drott Mfg. Corp., Milwaukee 8, Wis.

Low cost, pure filtered water, for small and medium size municipal water works now possible with a — SPARKLER Model SCJ self cleaning water filter

The model SCJ filter is a diatomite slurry feed filter designed to produce the highest quality pure water at a maintenance cost much lower than usually can be attained with older type filters.

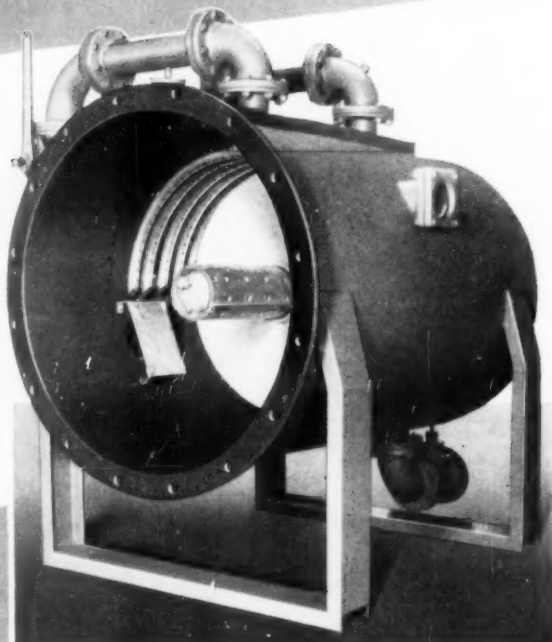
This filter can be cleaned in two to five minutes either by flushing off with the built-in jet spray or by backwashing or a combination of both. The filter media is usually a synthetic cloth such as orlon which pre-coats quickly and washes clean rapidly.

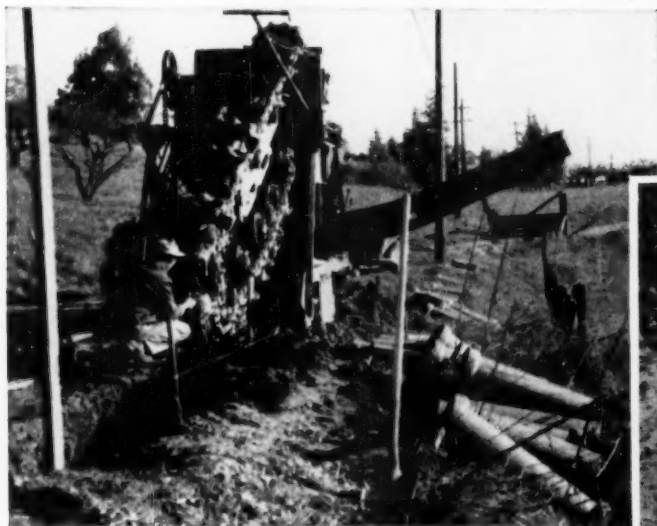
A high efficiency diatomite slurry feeder, which operates in conjunction with the SCJ Sparkler Filter, adds greatly to the length of cycle between cleanings... resulting in lower operating costs. Operators can be easily trained... no highly skilled specialized personnel required. Floor space occupied by the SCJ is relatively small for the extremely large volumes handled. Single units are available in sizes to handle up to 96,000 G.P.H. ... or over 1,000,000 gallons per day. And... this is important... the largest unit uses less than 1000 gallons of water to clean the filter.

Write for plans and prices on your requirements.
Personal engineering service on all installations.

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Manufacturers of industrial filters for over a quarter of a century.



CLAY PIPE—ESSENTIAL ★ ECONOMICAL ★ EVERLASTING

Clay Pipe—381,000 feet of it—was used in this sewerage project northeast of San Jose, California, a residential area that mushroomed as defense workers poured into the area.

**CLAY PIPE gets another 72-Mile Testimonial**

Here's a testimonial 381,000 feet long, proving once again that Vitrified Clay Pipe is the time-tested material engineers and public officials depend on for sanitary sewerage. Thanks to their foresight, thousands of new homes in the San Jose district, as well as essential housing projects throughout the nation, will enjoy the *permanent* sanitary protection that only clay pipe can offer.

Vitrified Clay Pipe assures generations of trouble-free service. Acid sewage or alkaline soils can't corrode it . . . time can't weaken it. It's the only chemically inert sewerage material — *the only pipe that never wears out!*

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206 Connally Bldg., Atlanta 3, Ga.

100 N. LaSalle St., Rm. 2100, Chicago 2, Ill.

703 Ninth & Hill Bldg., Los Angeles 15, Calif.

311 High Long Bldg., 5 E. Long St., Columbus 15, Ohio

WHEREVER RELIABLE PERFORMANCE-PROVED PIPE IS NEEDED, SPECIFICATIONS CALL FOR VITRIFIED CLAY

South Bend, Ind. (Private Housing)	93,000 ft.
Tuscaloosa, Ala. (Municipal Expansion)	44,000 ft.
Evansville, Ind. (Municipal Expansion)	200,000 ft.
Detroit, Mich. (Jet Engine Plant)	28,000 ft.
Topeka, Kan. (Private Housing)	13,000 ft.
Tucson, Ariz. (Municipal Expansion)	38,000 ft.
Minneapolis, Minn. (Private Housing)	80,000 ft.

Vitrified

CLAY

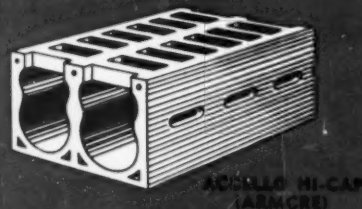
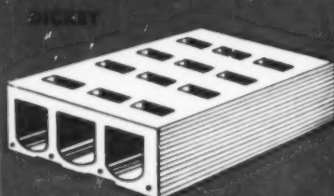
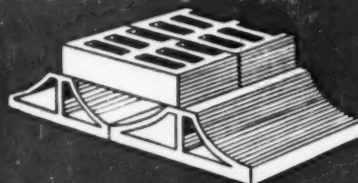
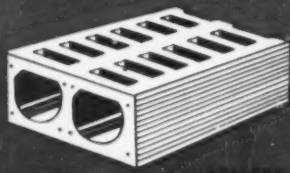
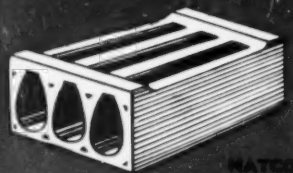
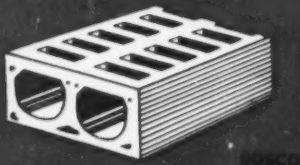
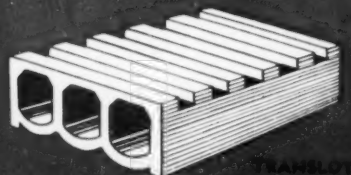
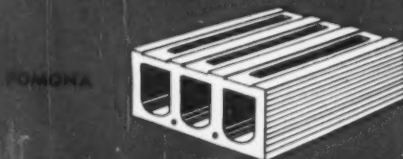


PIPE

C-1252 59

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FOR BETTER TRICKLING FILTER RESULTS



Get full details of this month's new products . . . mail your Readers' Service card today.

USE TFFI INSTITUTE SPECIFICATIONS UNDERDRAINS

The scientific design of these *vitrified clay filter bottom blocks* insures trouble-free operation for the life of the filter. They have large top openings. That means proper ventilation of all filter media and free discharge of the filter effluent at all times. They have smooth run-off channels. That means quick drainage and no clogging even with years of operation. The blocks are light in weight, self-aligning and easy for unskilled labor to lay. After they have been laid they are strong enough to work on and to support even very deep filter media.

These modern underdrain blocks will carry applications up to 50 MGAD. They are best for all kinds and shapes of filters. They are used everywhere better operating results are desired.

Use them to insure best results from your next trickling filter. Give it a *specification floor*. Use TFFI *vitrified clay filter bottom blocks*. For full engineering details write any member of this Institute today.



Here's the Payoff

Sackett Lake, N. Y.: Completed in 1951, this model small plant has TFFI underdrains and Dorr equipment throughout. Treating domestic sewage solely, the plant reduces the BOD of the raw sewage—230 ppm—to a clear effluent containing 14 ppm. Designed for 0.5 mgd, the flow on the sampling date (August 29, 1952) was 0.30. Olney Borden, Engineer, Liberty, N. Y. Yes . . . for best results, always specify TFFI *specification* underdrains.

TRICKLING FILTER FLOOR INSTITUTE

W. S. Dickey Clay Mfg. Co.
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Ayer-McCarel-Regan Clay Co.
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Thousands use our Readers' Service card to keep up to date . . . do you?

(Continued from page 26)

STREETS AND HIGHWAYS

Do You Have Complete Black Top Equipment Data?

41. In 36-page catalog AA a full line of maintenance is covered. Units described and illustrated include several models of pressure distributors, supply tanks, sprayers, brooms, asphalt kettles, portable rollers, and accessory tools. Use coupon for copy of this handy manual. Littleford Bros., 452 E. Pearl St., Cincinnati 2, Ohio.

Concrete Saw Cuts Smooth, Straight Edges

85. When the sides of patches and trenches are sawed before breaking, a saving of 25% in removal costs is claimed. And the smooth, straight edges won't spall or crack after replacement material is poured. Investigate the exclusive features that give maximum economy to Chipper concrete saws. Full information from Chipper Mfg. Co., 2823 S. Warwick, Kansas City 8, Mo., or check the handy coupon.

What's Your Traffic Problem?

127. Traffic signals and controllers of every type are offered by Eagle Signal Corp., Moline, Ill. You will find a great deal of helpful data and diagrams of typical installations in Bulletins A 10 and C 19, available by checking the coupon.

1001 Profitable Uses For Holmes-Owen Truck Loader

39. The addition of a Holmes-Owen Loader to your dump truck converts it into a complete digging and loading unit that enables one man

to load, haul and dump. Illustrated folder shows how this self-loading unit with hydraulic crowding action can be a real time and labor saver for the municipality or contractor. Check the handy coupon for full data. Ernest Holmes Co., Chattanooga, Tenn.

Fast Mowing in Hard-to-Reach Places

163. The lightweight, power driven Scythette mows smoothly near walls and trees or in rocky, hard-to-reach places; does the job 4 times faster than hand methods. Interchangeable chain saw unit, the Sawette, cuts trees and other growth up to 6" diameter. Check the coupon for illustrated folder offered by Hoffer, Inc., Richmond, Ind.

Valuable Booklet Tells Soil Stabilization Facts

206. All forms of soil stabilization, using any type of binder with any suitable aggregate, are covered in "Soil Stabilization Methods," Bulletin 25 published by Seaman Motors, Inc., Milwaukee 3, Wis. Get this valuable booklet for complete information on processing methods and the many uses of the Seaman Pulvi-Mixer by checking the coupon.

Latest Data on Rubber Roads

296. A new report covering all developments to date on the use of natural rubber in road surfacing of asphalt highways has been issued by the Natural Rubber Bureau, 1631 K St., N. W., Washington 6, D. C. Get your copy of this 52-page booklet which includes new data on research and full reports on test roads in many states. Use the handy coupon.

Use Hot Patch Material On All Maintenance Jobs

297. With the Barber-Greene Mixall you can get hot patch material wherever and whenever you need it for all maintenance jobs. Send for new 8-page bulletin that gives full information on this small, highly portable unit that turns out all types of bituminous patch material in any quantity you need. Write Barber-Greene Co., Aurora, Ill., or use the coupon.

BUSINESS AND ADMINISTRATION

Your Property is Worth Good Protection

176. When installing link fence you want protection against rust and corrosion as well as vandalism. Investigate chain link fence made of "Kantik" metal described in "Planned Protection" published by Continental Steel Corp., Kokomo, Ind.

10 Reasons for Blanket Bond Covering Public Employees

289. As a part of their modern bonding program the National Surety Co. presents 10 reasons for having a Public Employees' Blanket Bond covering your personnel in forms offering greatest protection per premium dollar. Get Form 23163 by checking the coupon. National Surety Corp., 4 Albany St., New York, N. Y.

SNOW AND ICE CONTROL

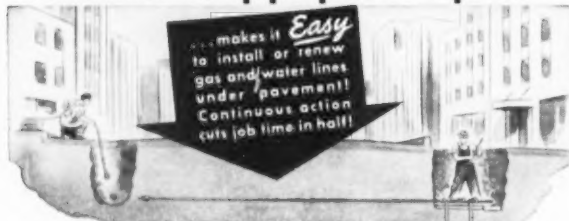
Snow Plows for Every Street and Highway Need

227. In a new bulletin, No. 51-F, full details are given on the Frink reversible trip-blade "Sno-Plow", which has special design features to eliminate chatter and to permit quick adjustment to nine plowing positions or scraping position for ice removal. Check the coupon for your copy. Frink Sno-Plows, Inc., Clayton, N. Y.

Uniform Salt Spreading Saves Material

145. The wide, thin pattern provided by Tarco "Scotchman" spreaders avoids salt waste, saves time and labor. Get Folder BL for full details on this spreader and table of material application rates. Use coupon or write Tarrant Mfg. Co., Dept. PW, Saratoga Springs, N. Y.

The TROJAN pipe puller & pusher



MODEL A for 1/2" to 1" pipe



MODEL B for 2" pipe and under



**WRITE TODAY
FOR FULL DETAILS**

With a Trojan, no resetting of grip is required—job goes twice as fast. Heavy duty, all steel construction makes it 4 times stronger than cast iron pusher.

Model A needs only 5 ft. trench. One man can easily lift it in and out of trench and install the average service. 15 tons of pushing pressure possible.

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Double XX heavy, 30" push pipe travels straighter.

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For Municipal and Public Works Projects

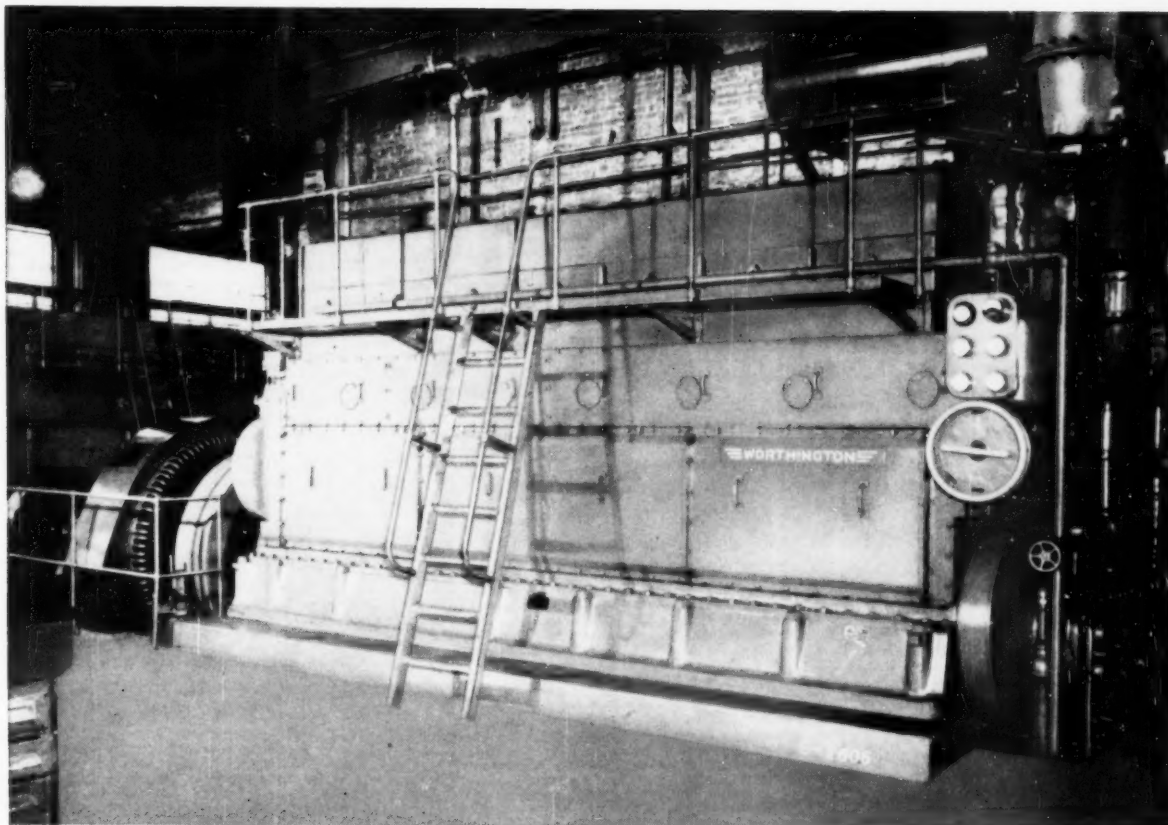
Street steam from a central boiler plant provides your city with clean, uniform heat, savings in fuel, and preservation of grounds and buildings through smoke elimination.

For reliable, efficient steam distribution, make sure your next Central Heating project specifies "Ric-wil Insulated Piping"—prefabricated for fast installation and minimum traffic interference. Catalog furnished on request.



UNDERGROUND OR OVERHEAD

THE RIC-WIL COMPANY • CLEVELAND, O.



WORTHINGTON 1085-KW DIESEL ENGINE, is one of three Worthington engines now serving at Ford City, Pa., municipal power plant. This engine, during first 2 years of operation, logged 16,490 hrs. with average lube oil consumption of 5,400 hp hrs per gallon.

Ford City, Pa.—Another “repeat” customer of Worthington Diesels

Borough officials take pride in power plant's operating economy during 16 years

Sixteen years have passed since the first Worthington Diesel was installed in the municipal power-generation plant at Ford City, Pennsylvania.

The latest installation—made in 1948—is a Worthington 1085-kw Diesel generator set. Other Worthington performers in the plant are the 300-kw unit installed in 1936 and the 462-kw unit installed in 1938.

Borough officials and the plant manager—who

pride themselves on operating economy—tell us they now take for granted the dependability of their Worthington engines. Local consumers—some 6,000—have the low consumption of fuel oil and lube oil, as well as low maintenance expense, to thank for their economical rates.

Worthington's complete line of engines can give your municipal installation the most economical power no matter what fuel is used. For more data on modern Worthington engines—gas, Diesel, or dual-fuel—write Worthington Corporation, Engine Division, Buffalo, N. Y.

E 24

Worthington-Built Auxiliaries



ENGINE STARTING COMPRESSORS



OIL TRANSFER PUMPS



COOLING WATER CIRCULATING PUMPS



EVAPORATIVE-TYPE ENGINE WATER COOLERS

Economical Continuous Power—Diesel Engines, 150 to 2,100 hp . . . Gas Engines, 190 to 2,100 hp . . . Dual Fuel Engines, 150 to 2,100 hp.

Now's the time to mail this month's Readers' Service card.

WORTHINGTON
Engines

SEWERAGE AND WASTE TREATMENT

What You Should Know About Trickling Filter Underdrains

20. Specifications for vitrified clay underdrain blocks conforming to ASTM standards, suggestions for layout and construction of trickling filter floors, dimensions of standard blocks, channel covers, angles and other fittings are available from the Trickling Filter Institute, c/o Editor, Public Works, 310 E. 45th St., New York 17, N. Y. Check the coupon and we will forward your request.

Valuable Booklet on Porous Diffuser Plates and Tubes

21. A helpful 20-page booklet published by the Norton Co. is a complete guide for the selection of porous media for installation in activated sludge plants. Full data for the designing engineer is provided by careful detailing of physical characteristics of plates and tubes. Maintenance of porous media also is discussed at some length. For your copy of Form 1246, write to the Norton Co., Dept. PW, Worcester 6, Mass., or use the coupon.

What's Your Problem in Industrial Waste Treatment?

22. Highly useful data on industrial waste treatment processes, as applied to more than 50 different types of waste, are covered in the B-I-F Industries "Industrial Waste Treatment Guide." Flow diagrams, installation photographs and equipment details are included in this helpful bulletin (B-I-F-4). Check coupon now for your copy, or write to B-I-F Industries, 345 Harris Ave., Providence, R. I.

How to Make Better Sewer Pipe Joints

27. How to make a better sewer pipe joint of cement—tight, minimizing root intrusion, better alignment of joint. Permits making joints in water-bearing trenches. General instructions issued by L. A. Weston Co., Dept. P.W., Adams, Mass.

How Cities Clean Sewer Lines From Street in One Operation

25. In a helpful 28-page handbook of sewer cleaning methods and equipment the makers of OK Champion sewer cleaners give full details of power and hand operated models. Also included are data on expansion buckets that take dirt from sewer to street in one operation, root cutters and other accessories. Get your copy by checking coupon. Champion Corp., 4752 Sheffield Ave., Hammond, Ind.

Design Data for Insulated Piping

188. For all jobs where insulated piping is required you will want full design data on Ric-wil, Prefabricated Insulated Piping. Get 28-page catalog from the Ric-wil Co., Cleveland, Ohio, for details on both underground and overhead lines.

Get the Facts on The Contact Aeration Process

94. Full engineering details on the submerged contact aeration process of sewage treatment, including diagrams of plant units, area requirements, operating costs and other details are available in a bulletin of the Hays Process Co., Box 768, Waco, Texas. Check the coupon to get the facts.

Forms for Every Concrete Pipe Shape

95. In addition to this a complete line of forms for standard concrete sewer and drainage pipe, special forms for varied shapes of every type are listed in the Quinn Concrete Forms Catalog. Copies available by checking the coupon, or write direct to Quinn Wire and Iron Works, 1621 12th St., Boone, Iowa.

End Root Problems With Root-Proof Sewers

107. Troubles caused by roots and corrosion in house connections can be eliminated by the use of root-proof Bermico sewer pipe. Full details on this smooth, waterproof, tight-sealing pipe available by checking the coupon, or write to the Brown Co., Dept. PW, 150 Causeway St., Boston 14, Mass.

What You Should Know About Chemical Proportioning Pumps

38. In an attractive new bulletin you will find latest information on the Heavy-Duty Chem-O-Feeder, plus many installation diagrams, construction and operating details, list of chemicals fed and other helpful information on constant rate and flow proportional chemical feeding. Get your copy from Proportioners, Inc., Providence 1, R. I., by checking the coupon.

Engineering Data on Digester Heating

128. An excellent 32-page bulletin covering all features of the PFT External Heater and Heat Exchanger unit discusses effective digester heating, size of heater and exchanger, space requirements, building heating, and related items. Curves and tables provide full data for the designer. Requests for this comprehensive bulletin, No. 235, must be sent on business letterhead. Pacific Flush Tank Co., 4241 Ravenswood Ave., Chicago 13, Ill.

Technical Data Offered on New "Barminutor"

156. The Chicago Pump "Barminutor" which combines a bar screen with a vertically traveling Comminator unit is now available for flows of 15 MGD and over. Units are readily installed in existing open channels. Get full technical data from the Chicago Pump Co., 632 Diversey Pkwy., Chicago 14, Ill.

Complete Data On Sludge Pumps

193. Sludge pumps, simplex, duplex, triplex and quadruplex, normal and heavy duty models, are described in Bulletin S48 issued by Marlow Pumps, Ridgewood, N. J. Check the handy coupon for your free copy.

Vacuum Filters Feature Easy, Non-Clog Operation

241. Get full data on vacuum filters using double layers of continuous coil springs that insure continuous, non-clog operation. Coils are automatically cleaned at each revolution. Komline-Sanderson Engineering Corp., Peapack, N. J.



For PRECISE FLUORIDE TESTS


Only HELIGE Offers These Exclusive Features...

GUARANTEED NON-FADING Glass Color Standards • Test based on official A.P.H.A. and A.W.W.A. procedure • Built-in illumination makes determinations always independent of time or weather • Stable components assure fresh, dependable reagent.

Easier, more accurate color comparisons because . . . magnifying prism attachment brings standards and test sample side by side—long Nessler tubes increase discrimination 15 times more than ordinary comparator tubes—optical glass plungers automatically adjust viewing depth—special filter increases small color differences for positive interpolation. And . . . additional standards are available for more than 25 other important water tests.



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 HEADQUARTERS FOR COLORIMETRIC APPARATUS AND COLOR STANDARDS



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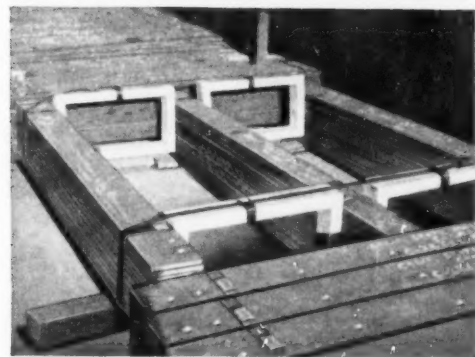
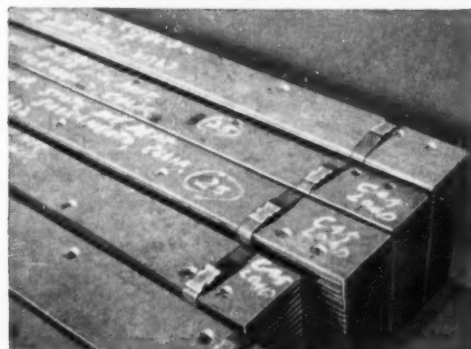
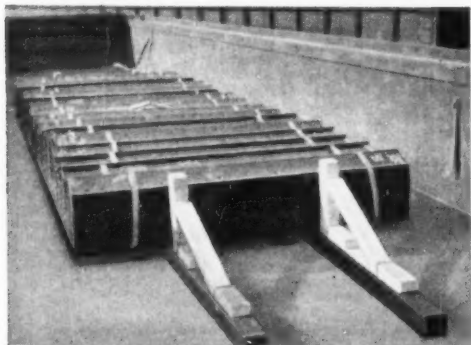
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Design Data Offered On The Spiragester

42. The Spiragester, a unit which combines the Spiraflo Clarifier and a digestion compartment in a two-level arrangement to save space and reduce construction costs, is fully described in Bulletin 124 released by Lakeside Engineering Corp., 222 West Adams, Chicago, Ill. Design details, including capacities for 8 to 24 units are furnished together with typical plan and elevation. Check the coupon for this helpful bulletin.

Helpful Installation Manual For Drainage Structures

62. A 46-page manual, well worth careful study by designers and field engineers dealing with drainage structures, culverts, sewers or conduits, is offered by Armo Drainage & Metal Products, Inc., Middletown, Ohio. Proper location of the structures, base preparation, assembly and backfill are some of the many items covered in detail. Use the handy coupon for free copy.

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Complete Catalog for Engineers Shows Water and Sewage Plant Equipment

191. The complete line of Jeffrey equipment for treatment of water, sewage and industrial wastes is covered in 52-page Catalog 833. Detailed information is provided on bar screens, grinders, grit collectors, "Jigrit" washers, sludge collectors, feeders, conveyors and other related units. Photos and drawings of installations plus capacity tables complete this valuable booklet. Use coupon or write Jeffrey Mfg. Co., 947 N. 4th St., Columbus 16, Ohio.

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Helpful Design Data For Sewage Ejectors

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Floatless Liquid Level Controls

92. Complete descriptions of electrode type floatless liquid level control systems, including control units, electrodes and fittings, panel assemblies and diagrams of typical installations for all types of municipal service are covered in the 32-page catalog of Charles F. Warrick Co., 1956 W. Eleven Mile Rd., Berkley, Mich. Check coupon for your copy.

Site-Cast Concrete Pipe Saves Construction Dollars

194. A new brochure, "Large Diameter Pipe Made at the Site", tells how the Universal Concrete Pipe Co., Columbus, Ohio, ships mobile equipment and key personnel to large projects where local labor and materials are used to produce large-diameter and long-length reinforced concrete pipe. Costs are cut and shipping damage prevented by this method. Check coupon for details.

Data Offered On Mixed Flow Pumps

201. Data on the complete line of Worthington Mixflo pumps of the two-vane, non-clogging sewage type is offered in 16-page bulletin

W-317-II16. Salient features are outlined, typical sections, performance curves and general data for five types are included. Helpful charts aid shafting selection. Copies available by using coupon or from Worthington Corp., Harrison, N. J.

How Vacuum Filters Help Your Sewage Sludge Disposal

209. Applications of the Conkey sludge filter to all types of sewage sludge are described in Bulletin 100. Tables show filter sizes, weights, and give anticipated average results. Use the coupon to order your copy. General American Transportation Corp., Process Equip. Div., New York 17, N. Y.

Handbook of Castings For All Public Works Construction

220. Every type of construction casting needed by engineers and contractors in the public works field will be found in a 136-page catalog issued by Neenah Foundry Co., Neenah, Wis. Detailed illustrations and complete tables of dimensions will help the designer and materials buyer. Get your copy of this valuable catalog by checking the coupon today.

Efficient Blowers for Activated Sludge Plants

232. Many advantages of Roots-Connorsville positive displacement rotary blowers are described in Bulletin 22-23-II-13, which also provides characteristic curves for operation with constant speed, multi-speed and variable speed motors and details of several types of blowers. Get this helpful bulletin by checking the coupon. Roots-Connorsville Blower Corp., Connorsville, Ind.

General Catalog on Measuring and Controlling Equipment

272. The full line of Simplex equipment for the measurement and control of liquids and gases in water and sewage plant installations is illustrated and described in detail in 28-page Catalog 003. Every engineer should study the design data in this helpful booklet. Write Simplex Valve & Meter Co., 68th & Uplands Sts., Philadelphia 42, Pa., or use the coupon.

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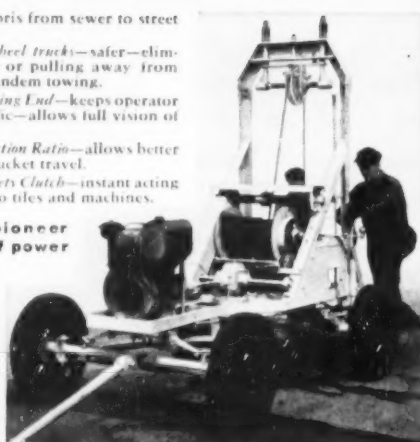
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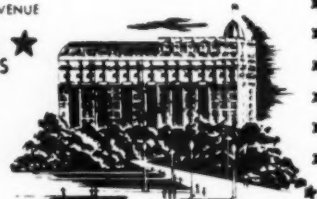
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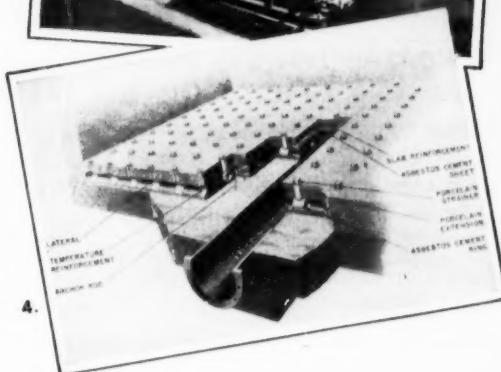
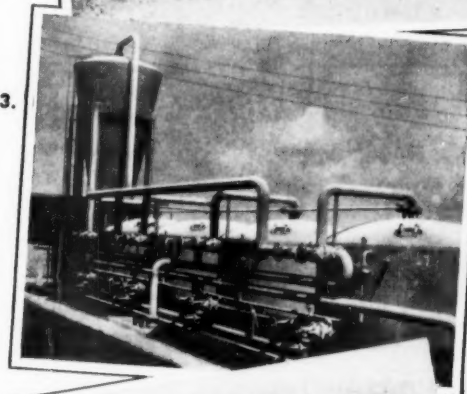
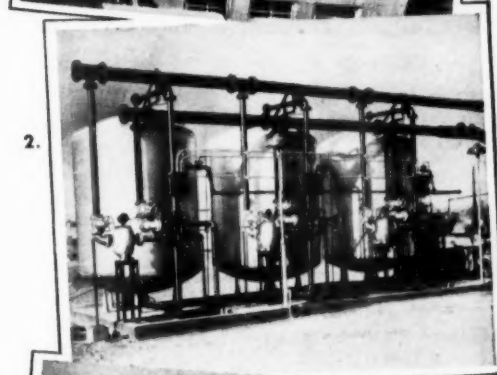
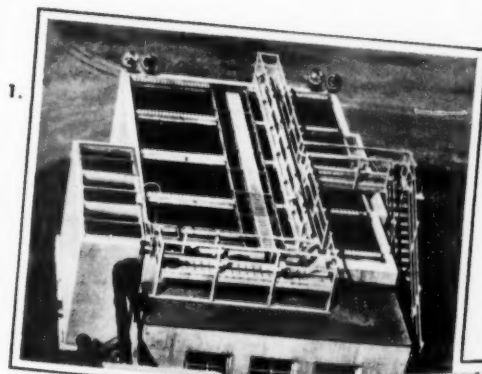
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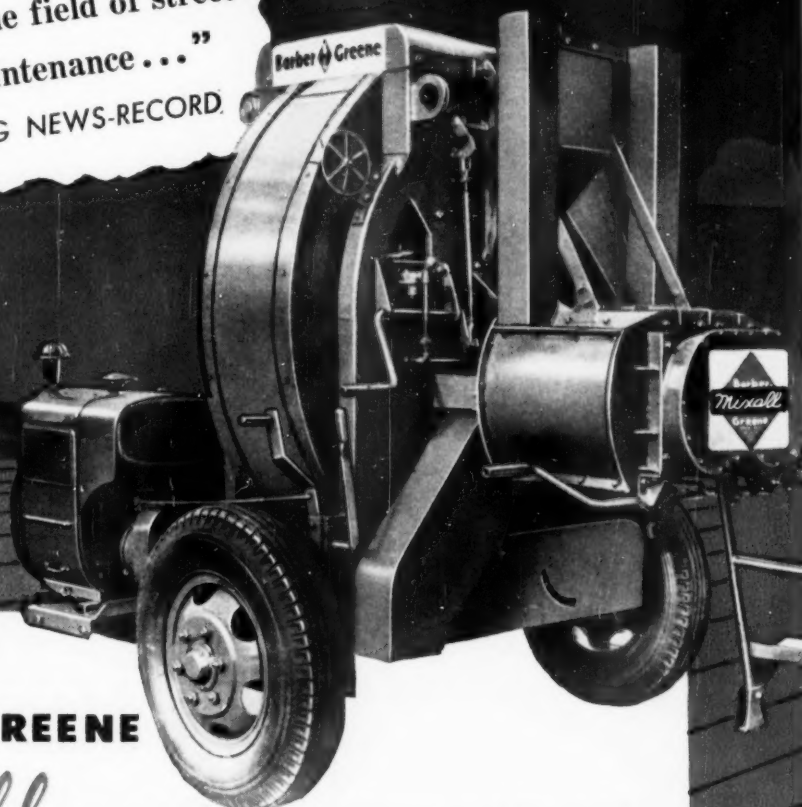
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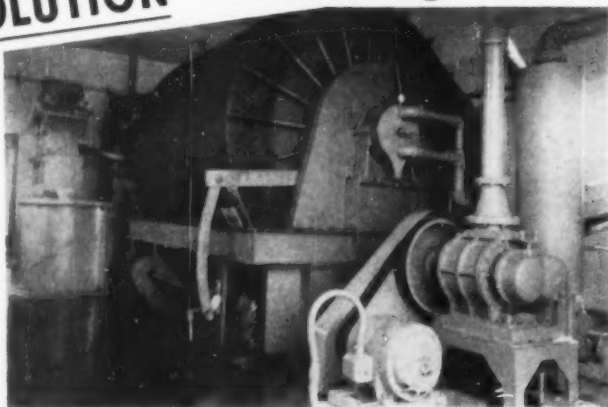


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How to Make Fluoride Determinations

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290. A complete catalog covering repair clamps, packings and gaskets of several designs to suit all needs is offered by Smith-Blair, Inc., So. San Francisco, Calif. Directions for use show ease of application. Every water works needs a copy of this catalog for ready reference. Available by using the coupon.

Factors to Consider in Elevated Tank Selection

299. Details on the several different types of elevated steel tanks, including capacity ranges, tank dimensions and other factors to be considered in the selection of elevated tanks for modern water storage, plus discussions of new tanks for old towers and foundations are included in Bulletin 101 of the Pittsburgh-Des Moines Steel Co., Neville Island, Pittsburgh, Pa. Check coupon for your copy.

Trencher Fits Municipal Needs

315. A new bulletin describing the Cleveland Model 95 trencher has been published by the Cleveland Trencher Co., Cleveland 17, Ohio. The Model 95, called "The standard machine for city and suburban work", is versatile, maneuverable and economical for use on water lines, service lines, road widening and all utilities trenching. Get this 8-page illustrated bulletin by checking the coupon.

These ADAMS Machines

clear streets of snow and ice with high-speed efficiency



Adams Motor Grader breaking up ice for loading into trucks.



Adams TravelLoader picks up and loads windrowed snow at better than truck-a-minute clip.



Adams Motor Grader, equipped with snow wing, clearing snow from residential street.

● You don't need special equipment for high-speed removal of snow and ice from your streets—not when you put an Adams Motor Grader and TravelLoader on the job.

In heavy-traffic areas, an Adams Motor Grader quickly breaks up and windrows hard-packed snow and ice for truck removal. Equipped with V-plow, snow wing, or using just the grader blade, it does a high-speed job of blading snow to the curbs in less congested sections.

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New WHITE makes excellent Tow Truck for traffic division

TORONTO—Traffic violators get towed away in style in Toronto. The White 3000 shown here is ideal for towing service because of its new weight distribution and excellent maneuverability. It's a Model 3020 that saves time getting towed cars out of heavy traffic and congested areas—where it's mighty important.



City handles its own Big Moving Jobs

COLUMBUS—If you want to save equipment and crew "down time", do it yourself. That's the way the City of Columbus figures it. So they put this handsome White 3000 to work handling heavy equipment hauling jobs themselves. Another case where the White 3000 boosts efficiency because of its ready adaptability to specialized jobs.



This WHITE really stretches out to do an efficient job

BOSTON—Consolidated Edison Co. saves time in overhead maintenance work with the White 3000 teamed with this Sky Lift unit with two crows' nests that extend to a 40 ft. working height. The White 3000 provides low center of gravity, shorter turning radius, shorter overall length and maximum maneuverability—ideal for this service.

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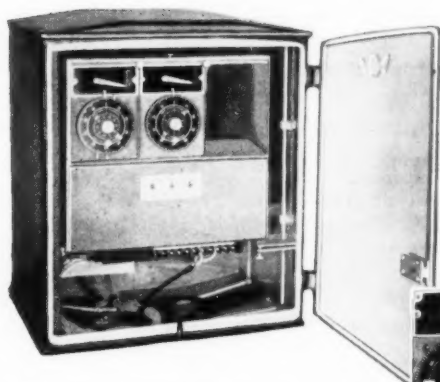
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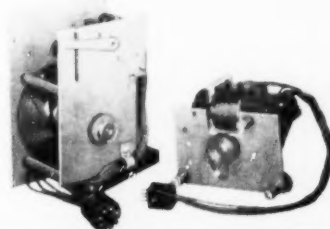
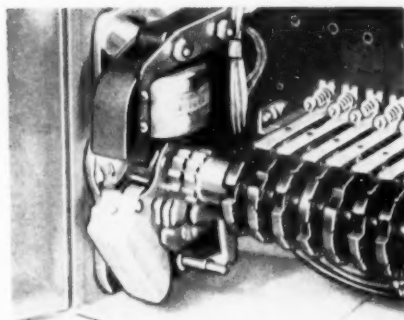
faster synchronizing without stopping motor.

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provides instantaneous change of lights without dark periods or overlaps.

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accessible from top, front and back, motor and dial units are jack-connected for quicker, easier maintenance.



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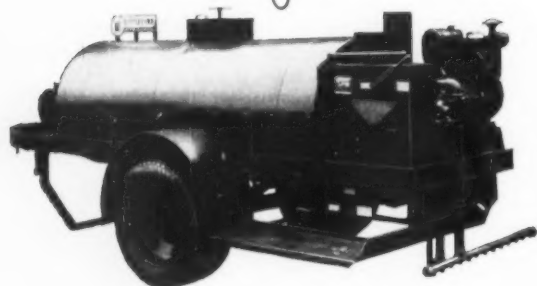
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It has a spray bar for small application jobs, a hand spray for patch work and a pouring pot outlet for crack filling and patch work. Where is there a unit with more utility — more modern efficiency? Not only does this 101 save operating dollars, but its long life saves the maintenance dollar year after year. If you want the best for your money, you'll want the Littleford Model 101 Utility Spray Tank. Write for Bulletin 5.



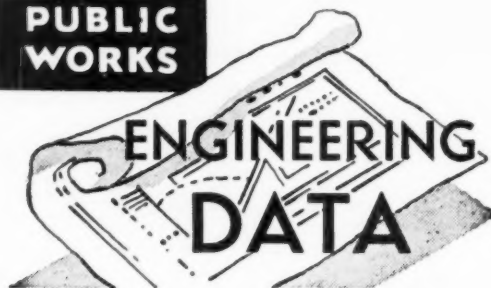
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PUBLIC WORKS



Population Forecasts for New England and New York

Population forecasts of the New England and New York area have been prepared by the Bureau of the Census to include the years for 1975 and 2000. These estimates which were included in a report of the New England-New York Inter-Agency Committee, are as follows:

	1975	2000
Maine	1,064,000	1,164,000
New Hampshire	624,000	684,000
Vermont	407,000	432,000
Massachusetts	5,412,000	5,912,000
Rhode Island	905,000	992,000
Connecticut	2,575,000	2,912,000
New York	17,798,000	19,694,000

• • •

A Treatment Plant for Cotton Finishing Wastes

Operation of the waste treatment plant of the Sayles Finishing Company at Saylesville, Rhode Island, on the Moshassuck River, a tributary of the Providence River, began last August 31st. The new facilities, which include high rate trickling filters and secondary settling basins, are in addition to older facilities and involved an expenditure of \$500,000. The plant is designed to treat 3 1/3 million gallons per day of cotton finishing wastes. This represents the first installation in Rhode Island of a complete treatment plant for cotton finishing wastes.

• • •

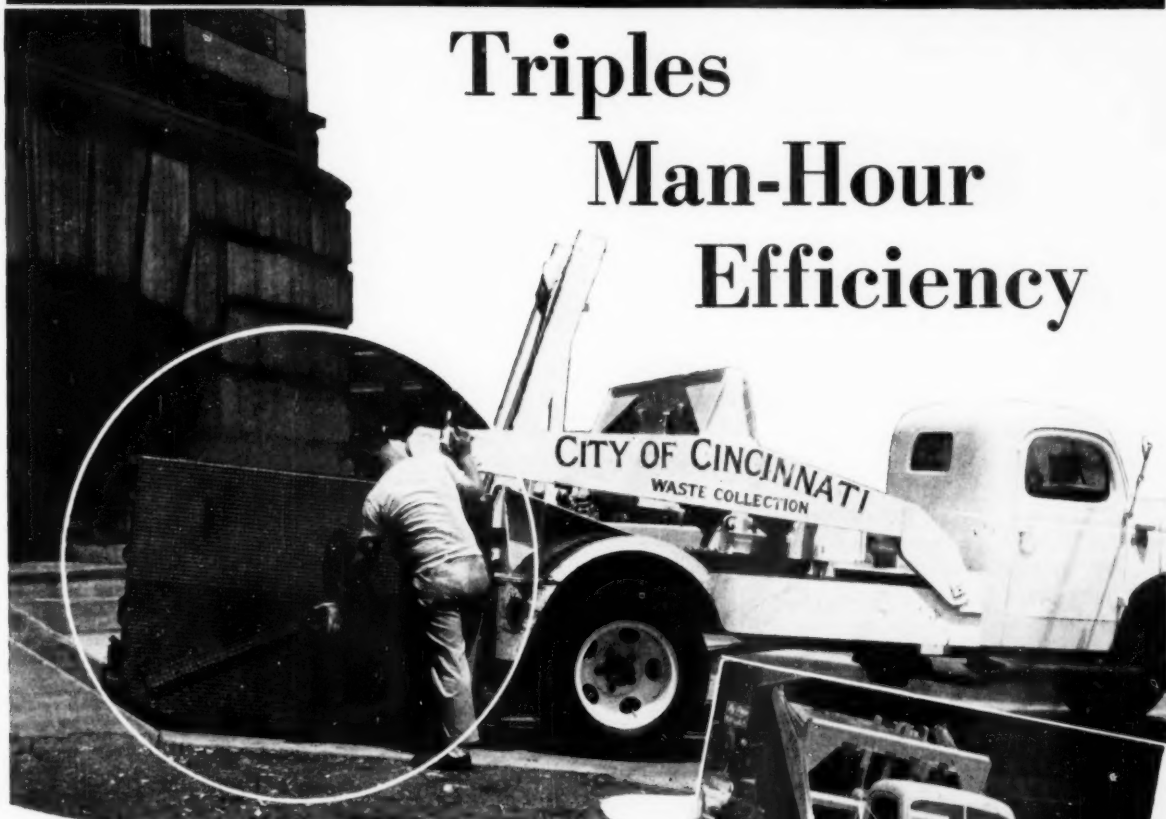
Filter Flies and House Flies at Sewage Plants

Treatment of a trickling filter to control filter flies at Litchfield, Ill., was reported recently in the "Digester" of the Illinois Department of Health. Trichlorobenzene was used. The filter was flooded to within six inches of the surface and 2.5 gallons of the poison was spread over the filter; the water level was then raised to cover the surface of the stones, and the filter left to stand overnight. The size of the filter and the method of applying the trichlorobenzene were not stated. It appears that the larvae, but not the ova, are destroyed by this treatment, so that if eggs are present, treatment may have to be repeated. However, the one treatment, made in July, effected control for the remainder of the year. There is a possibility that this poison may affect the stream into which the plant effluent is discharged.

At Urbana, Ill., house flies were breeding in the sludge drawn to the drying beds. This sludge was not well digested, and was drawn during the process of cleaning the digester. Trichlorobenzene was used for control and the larvae were readily killed. However, the use of this poison necessitated flooding the

The **DEMPSTER DUMPSTER**® Rubbish Collection System

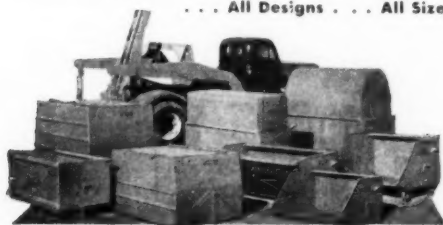
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A truck-mounted Dempster-Dumpster, with only one man, the driver, is constantly on the move servicing a multiple number of detachable containers, one after another. Container sizes range up to more than three times the capacity of the average dump truck body. They are spotted at accumulation points such as business establishments, schools, etc. and loaded by the user. On schedule the Dempster-Dumpster picks up each container, hauls to disposal area and automatically dumps the refuse by means of hydraulic controls in truck cab. Without question, the Dempster-Dumpster System is the most economical and efficient method of trash collection by truck ever devised. Manufactured exclusively by Dempster Brothers, Inc.

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Photos above show the Dempster-Dumpster System at work in Cincinnati, picking up, hauling and the start of dumping the bulky load from one of their 6 cu. yd. containers.

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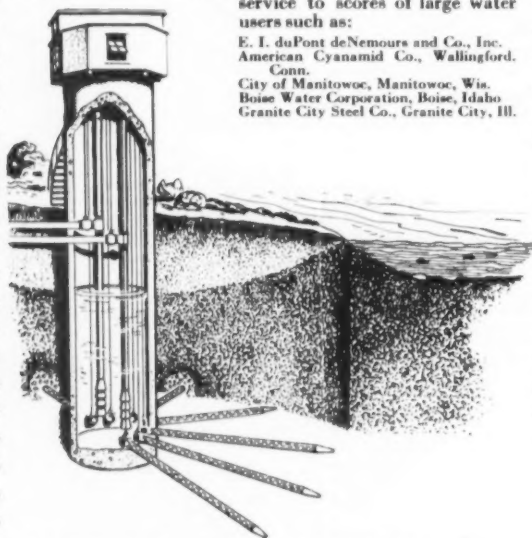
A single Ranney Water Collector has produced more clear, cool water than ten conventional vertical wells.

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The longer life of a Ranney Water Collector lowers financing and depreciation rates appreciably.

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Ranney Water Collectors are currently rendering excellent service to scores of large water users such as:
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beds, and before they had dried out again, another batch of flies hatched. Alum was then added to the sludge to speed up dewatering and the flies were brought under control.

House flies will not ordinarily breed in properly digested sludge, but they will breed heavily in sludge that contains undigested organic matter. It is generally better to use an oil-cresote, or other insecticide that can be applied as a spray.

Hourly Water Flow, Maximum and Minimum Days

Hourly water consumption for the maximum day (Tuesday, Aug. 14, 1951) and the minimum day (Sunday, April 15, 1951) for the fiscal year ending March 31, 1952, are reported by the St. Louis, Mo., Water Department, Thomas J. Skinker, Commissioner, as follows, average consumption being 162.02 mgd:

Hour	Maximum Day	Minimum Day
Midnight to 1 am	6.6	4.3
1 am to 2 am	6.2	3.9
2 am to 3 am	5.7	3.9
3 am to 4 am	5.2	3.9
4 am to 5 am	6.0	3.3
5 am to 6 am	5.7	3.9
6 am to 7 am	8.0	4.1
7 am to 8 am	9.2	5.7
8 am to 9 am	10.4	5.5
9 am to 10 am	10.4	6.4
10 am to 11 am	11.1	5.7
11 am to noon	11.5	6.2
noon to 1 pm	10.8	5.6
1 pm to 2 pm	11.1	6.1
2 pm to 3 pm	11.1	5.2
3 pm to 4 pm	10.8	4.8
4 pm to 5 pm	10.8	4.7
5 pm to 6 pm	10.2	5.0
6 pm to 7 pm	10.2	5.4
7 pm to 8 pm	10.2	5.3
8 pm to 9 pm	8.7	5.0
9 pm to 10 pm	8.8	4.9
10 pm to 11 pm	7.2	4.9
11 pm to midnight	7.2	4.7
Total flow MGD	213.1	118.4

Cleaning the Piping System of a Fixed Nozzle Filter

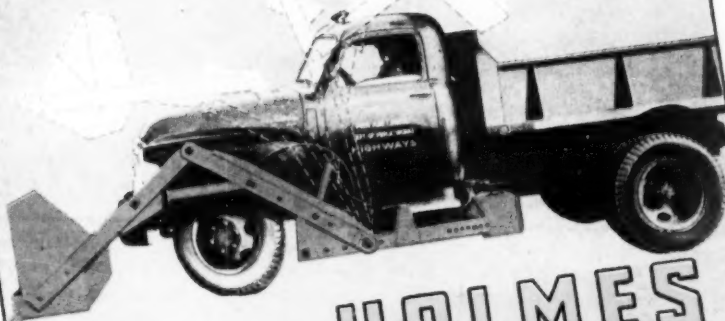
Experiences in cleaning the distributing piping of a fixed nozzle trickling filter at Jacksonvill, Ill., was described in a recent issue of the "Digester" of the Illinois Department of Health. It was found that the 6-inch laterals were badly affected. Filter stone in the lines appeared to be responsible in most cases. The first step was to run an "electric eel" with a 6-inch cutter blade through the laterals from the outer edge of the bed toward the center line main header. The second operation was to run a 6-inch water turbine through the lines. This had a cutter edge on the front as well as a water spray and it was pushed through under about 88 pounds water pressure. The run was from the edge of the bed to the influent header, with the turbine going in and coming out under pressure. Finally, a steel spring and cutter bar was pushed through to force out the stones that had been in the pipe and the muck that had been dislodged in the cutting process.

The 2½-inch uprights or risers were cleaned by using a 2½-inch round steel brush driven by a ¾-inch electric drill. New bushings and spray nozzles, plus new piping in the dosing tank, completed the job of reconditioning.



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Shows How HOLMES-OWEN Truck Loader Reduces Cost of Many Jobs For State, County and Municipal Uses.

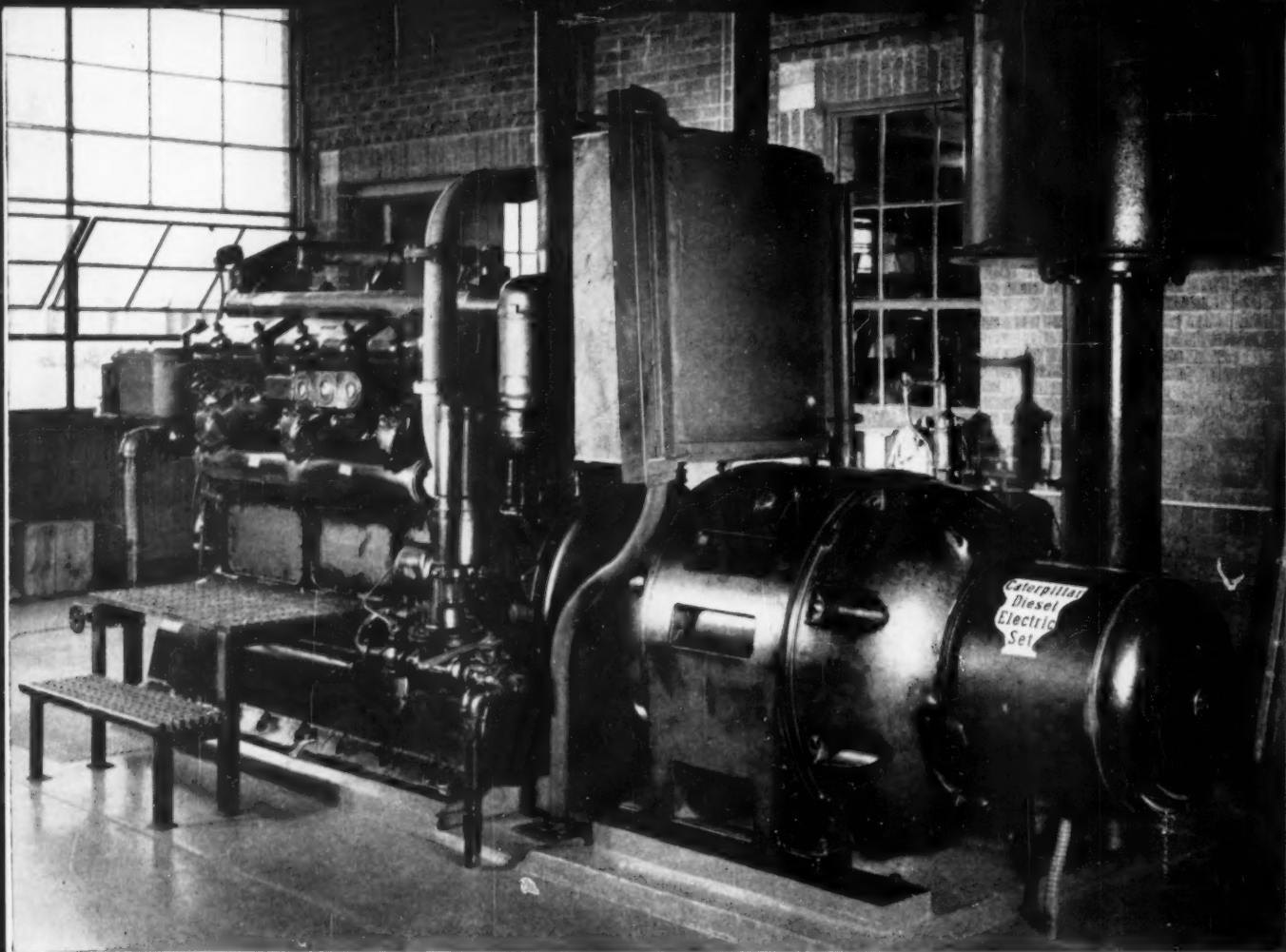
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Standby for emergency in Blooming Prairie

The tidy village of Blooming Prairie in the heart of farm-rich southwestern Minnesota may be small as cities are reckoned—but it's big in the way it protects its 1,500 citizens. It uses a dependable, easy-starting Caterpillar D397 Electric Set to overcome the menace of power blackouts.

Blooming Prairie's municipal power plant puts out an average of 1,200 KW to light 350 homes and its streets, and to provide power for a soybean plant, creamery, mill, churches and other public buildings. J. E. Mack, superintendent of the power plant, explains why the village no longer fears blackouts:

"We've had to use our D397 for emergencies. It ran continuously for a long while giving efficient, trouble-proof service. It's very economical on fuel. We use it for standby and also during those periods when demand becomes heavy during the dark winter months."

There's also hard-headed business logic in investing

municipal funds for Cat multiple Electric Sets instead of a single large unit. When a large unit breaks down, a complete blackout results. Not so with a multiple-unit setup. Too, multiple sets can be matched to the load to offer fuel savings and to reduce engine wear. And Caterpillar Electric Sets operate on low-cost No. 2 furnace oil. You have a complete selection up to 315 KW.

Your Caterpillar Dealer can show you the electric sets that fit your needs. They're money-saving investments in these inflationary days.

CATERPILLAR, PEORIA, ILLINOIS

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**Diesel Engines
Electric Sets**

Nine-Acre Screen Protects NEW HIGHWAY FROM FALLING ROCKS

ART WINTLE

ROCKS began to shower down a 200-foot cliff and roll out on four lanes of a newly constructed section of Highway 99, north of Vancouver, Washington, before contractors packed their tools and turned the job over to the state. While this is not an uncommon occurrence in western road building, the fact that the state went to work and did something about the situation may be the forerunner of picking a big problem.

Under the direction of W. A. Bugge, head of Washington's State Highway Commission, a contract to install a wire mesh over a nine-acre area of vertical cliff face was let to the contracting firm of Erland and Blickle of Portland, Ore., on a \$70,000 low bid, which included the material needed for the work.

With Paul J. McKay, district state highway engineer and L. S. Snyder, resident engineer supervising construction, the following is the manner in which the job was done:

The mesh came in rolls 12 ft. wide and 100 ft. long. A heavy-duty

wrecker was driven along the old highway to a spot about 125 ft. above the new lower route. Directly below the wrecker a truck mounted American hoist was parked. A cable was first placed through a block attached to the wrecker boom and both ends dropped to the new highway. One end was attached to the hoist drum and the other to the mesh roll end. Another cable was let down from a Gar-Wood winch on the wrecker and also attached to the roll end.

A signal from Wallford F. Martin, project superintendent for Erland and Blickle, started the hoist in action and the roll went upward. At top position the unrolled 12-ft. strip was out about 25 ft. from the cliff face and it was here that the Gar-Wood winch played in cable to secure the strip into final position to a 1-inch anchoring cable which was fastened to old highway guardrail foundations.

The second and following units were brought up and anchored likewise as teams of workers on ropes

laced the sections together to a base point about 10 ft. above the new highway. Here protection ended. Occasional rocks may fall from this area harmlessly into the ditch at the highway edge.

The overall protection calls for four of these strips to be placed as a station. Some 110 complete units are spaced about 25 ft. apart and actually cover an area of some nine acres of vertical cliff face.

The problem of falling rocks and slides on many western roads is a serious one. Little can be done with the slide problem other than to relocate the highway, if possible, to a relatively safe spot and hope for the best. Falling rocks are a more frequent problem and while they rarely cause any major mishaps, they are a daily maintenance problem and do create certain hazards between trips by the clean-up crews. State officials are watching the results of this project closely, for its success may begin a new development in Northwestern road construction and maintenance.



● WRECKER on old highway above holds end of screen for final fastening to guard rail posts shown in foreground.



● TYPICAL of the areas being screened. Winch at lower right raised the screen into position for fastening above.

HOLES WITHOUT HOLDUPS

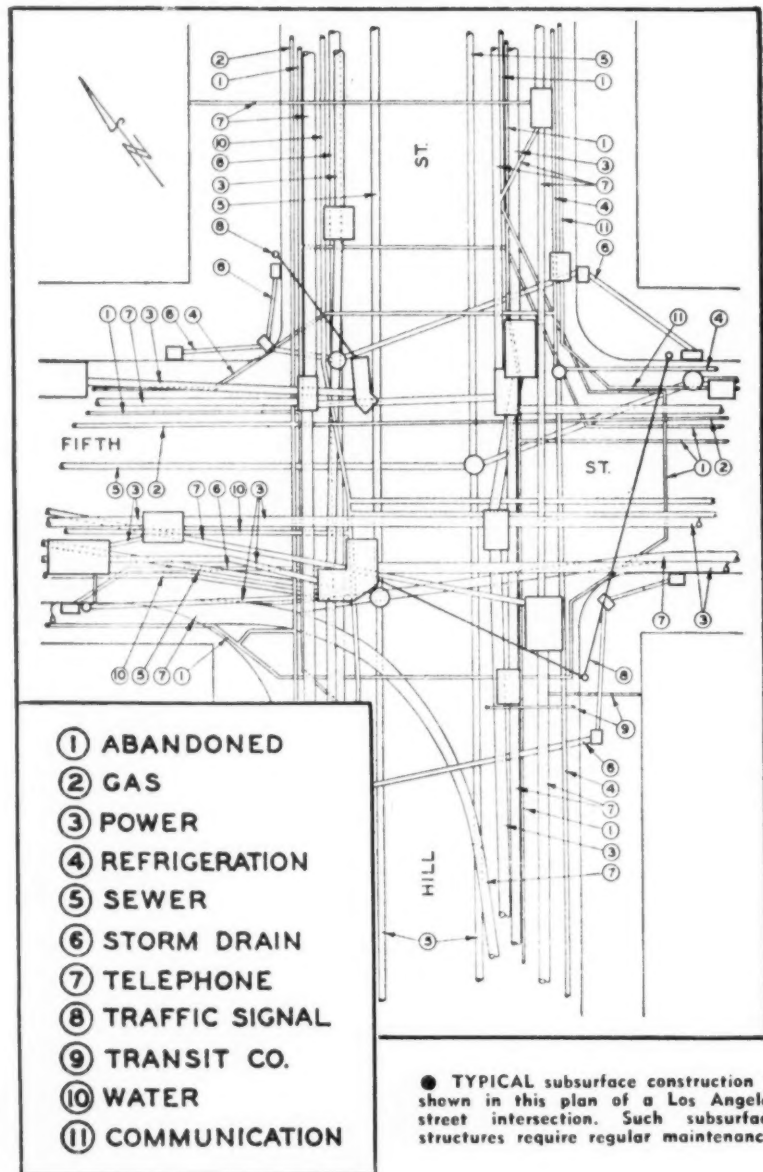
● A Study of Surface Traffic Interference

STREETS and highways are used for two important purposes: (1) for the movement of vehicles and pedestrians; and (2) as a location for utilities. Some of these utilities, as sewers, storm drains and water and gas lines, are fundamentally underground structures; but as population density increases, more and more other utilities also are forced underground.

An example of typical subsurface traffic congestion is shown in the drawing herewith. Though this represents a Los Angeles street, it is typical of perhaps thousands of others. The average citizen too frequently thinks of a street or road only in terms of surface traffic and as a convenience in getting from place to place. Few realize the enormous volume of flow of many kinds of subsurface traffic. An important gas main may carry millions of cubic feet of gas in a day; a water line will carry hundreds of thousands of cubic feet of water which, if transported by truck, would require traffic sufficient to clog the highway; telephone cables carry innumerable messages a day; and electric power cables may transmit more power than the total of the automobiles that pass above them. The actual volume of subsurface traffic is enormous and urban populations could not survive without it.

The greatest inconvenience to surface traffic occurs when the subsurface structures are being built. However, there are also continuing needs for the operation and maintenance of these underground structures and these require the occasional openings of manholes and vaults or of the street surface. In addition, the great population growth of the past few years has, in many cities, necessitated major expansion of such underground service facilities.

Since such street openings are unavoidable, the problem becomes one of working out cooperative methods whereby both types of traffic—surface and subsurface—can be maintained with a reasonable minimum of inconvenience and a reasonable maximum of efficiency in construction and operation.

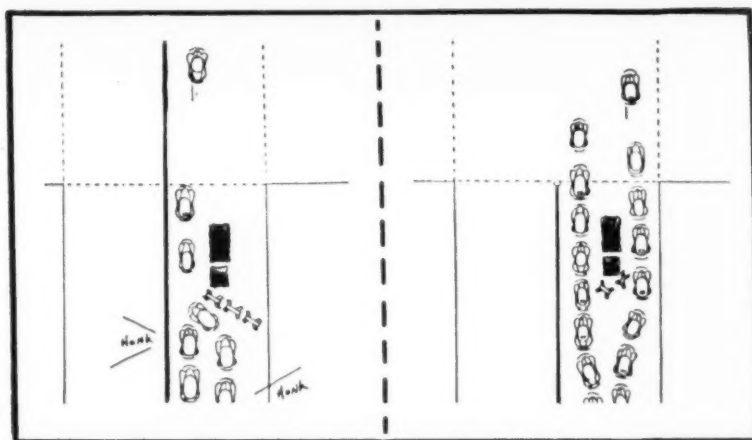


● TYPICAL subsurface construction is shown in this plan of a Los Angeles street intersection. Such subsurface structures require regular maintenance.

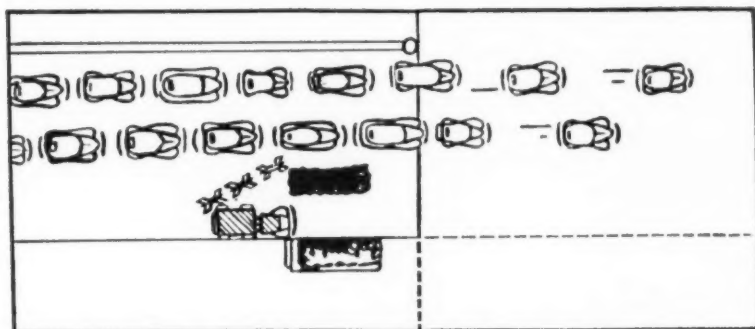
Traffic investigations have developed the fact that a great many different types of operations of the nature outlined above may interfere with surface traffic movement. However, the three principal causes of traffic interference have been found to be (1) excavations; (2) open manholes; and (3) the parking of

working equipment or of employee-owned vehicles.

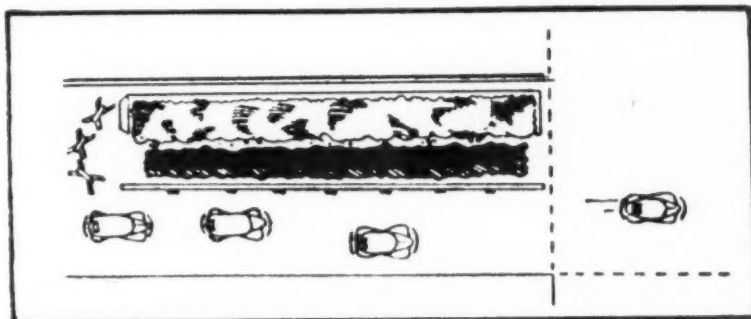
Each of these three causes of traffic interference will be discussed more fully. It is important to know that a primary element in all of them is "time"—the time of day, the day of the week, and the season of the year. Too drastic a restriction



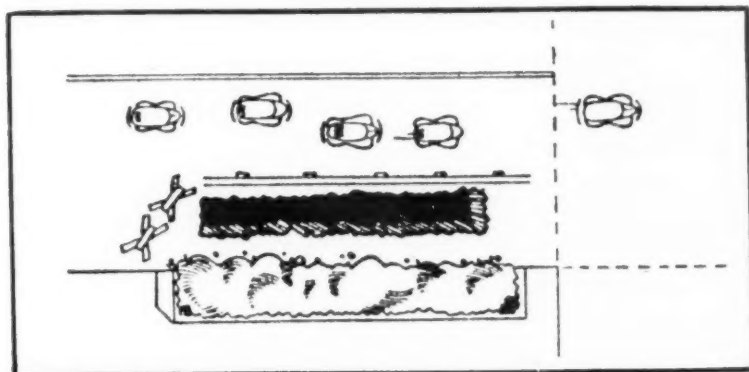
● LEFT ABOVE is wrong and blocks two lanes. Right permits two traffic lines.



● TWO LINES of traffic are permitted and the worker is protected by this method.



● TOE BOARDS restrict space needed for fill, permit vehicles to use normal lane.



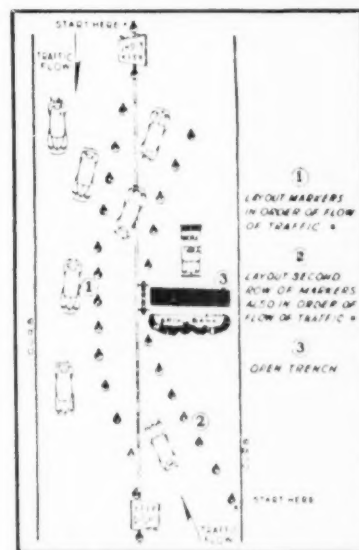
● METHOD OF handling excavation in curb lane, with drainage and boxing of spoil.

of time for utility work operation will increase the cost of service. In this, as in the other factors to be mentioned, a reasonable compromise is necessary.

Excavations

Excavations are troublesome from a traffic standpoint. The job may extend a considerable distance along the street; lateral excavations may be necessary, cutting across all or part of the street; interference with traffic may be severe; and such interference may continue for some time, in the case of major work. Proper placing of barricades and their prompt removal when they are no longer necessary; and the utilization of all possible measures to reduce interference with traffic are necessary.

Experience indicates that providing the public with information about a project is good only if it is apparent that a reasonable effort has been and is being made to inconvenience the motorist as little as

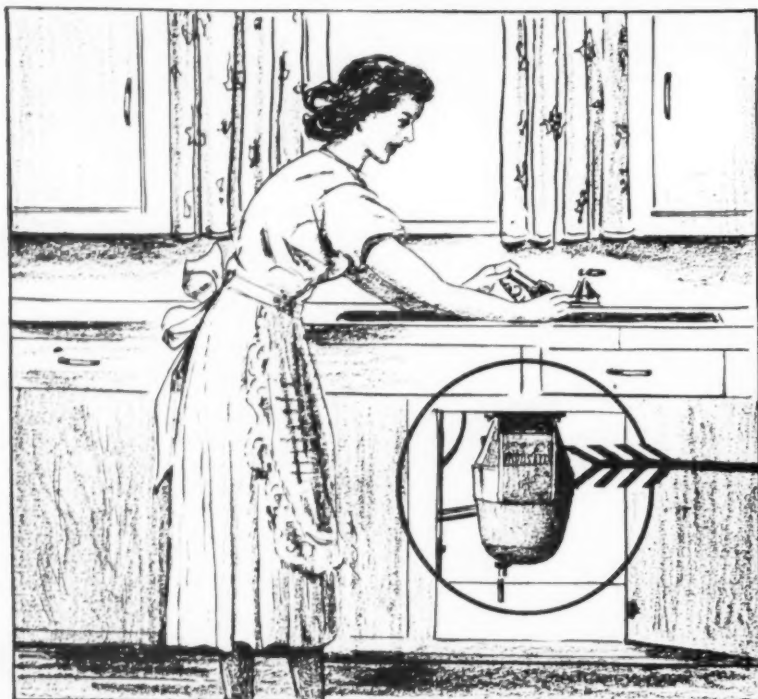


● IF YOU have to direct traffic across centerline of street, do it this way.

possible. Where this interference is reasonable with respect to the work necessary to be done, the public, in general, appreciates brief information concerning the need for the project, and what it will accomplish. This may be accomplished through newspapers or by means of appropriate signs.

The more important elements to be considered in reduction of traffic interference from street excavations are:

(Continued on page 105)



no precedent to indicate how much increase of capacity of the treatment plant would be necessary. Part of the service to be rendered by the present study is the provision of data for use in designing treatment plants for similar conditions elsewhere.

The city is served by both sanitary and storm water sewers. Prior to August 1, 1950, household garbage was collected twice a week by a private scavenger and fed to hogs.



Community Effects of HOUSEHOLD GARBAGE GRINDING

FIRST community in the United States to attempt the city-wide installation of household garbage grinders was Jasper, Ind., a municipality of 5,215 population. The results of this attempt are, therefore, being watched with great interest by other communities and by those engaged in municipal sanitation. These results can be considered from the points of view of effects upon water consumption, upon the sewers and the sewage treatment plant, on refuse disposal generally, on cost to householders, on approval by the citizens, and on the health of the community.

Various pieces of information on some of these points have been made public from time to time, principally by officials of the community. It would be but natural to assume that these were likely to be biased favorably. It is therefore fortunate that a study has been made, and is being continued, by the Public Health Service and the Indiana State Board of Health. Ralph C. Graber, senior sanitary engineer, represented the former and George K. Erganian and Walter G. Belter, sanitary engineers, the

latter. A report has been prepared, based on investigations made between March, 1950, and October, 1951. This is considered preliminary only "since there is need for more data in some phases of the study before additional conclusions can be drawn."

The investigation was broken down into two major categories: (1) The municipal services, such as water supply, sewers, sewage treatment, and refuse collection, which might be affected; and (2) those measures of environmental sanitation, such as fly and rodent populations, and morbidity and mortality records, which might be considered indices of the actual health benefits derived from this method of garbage disposal.

General Data

Previous to 1949, Jasper had not treated its sewage. Plans for a treatment plant of the activated sludge type were completed in 1948; but meantime the city decided to adopt home grinding of its garbage and disposal with the sewage, and the plans were revised to provide for this additional loading. There was

Rubbish was collected by the city from each home once every three weeks and taken to a city-owned open dump. At that time, there were already 80 household grinder installations in use.

Installation of the grinders under the city plan began in March, 1950. By July 28 of that year, there were 714 in service and garbage collection service was discontinued on Aug. 1. It was estimated that 1,200 families were potential users of household units. The city passed an ordinance allowing each home to dispose of its garbage in any manner satisfactory to the City Board of Health after discontinuance of the collection service.

At the time of the study over 300 grinders were in operation. Citizens not having grinders, and commercial and industrial establishments, were depositing garbage at the city dump. The sewage treatment plant was placed in operation in June, 1950, when about 550 grinders had been installed. During the next few months, a number of minor adjustments and changes in the physical features of the sewage treatment plant were made; and the

personnel, which had had no previous experience of this type, were learning to operate it. Routine operation was not established until late in the fall of 1950; was interrupted the following winter by sewer failure; and was renewed in May, 1951.

Results of the Study

Water Consumption.—The Jasper Water Department had well-kept records covering residential, com-



mercial and industrial consumption for six years previous to the grinder installation, and these records were maintained through the study periods. There was no increase whatever in residential water consumption following installation of the grinders. In fact, comparing residential consumption for the first three months of 1951 with that for the first three months of 1950, there was a decrease from 27.3 gals./cap./daily to 27.1 gals. A sewer service charge was initiated during the period the grinders were being installed. It is suggested that there may have been conservation in the use of water by consumers in a desire to minimize an anticipated increase in meter bills. Records during the next two or three years may furnish more useful data.

Sewer System.—The sanitary sewers are mostly 8-inch and 10-inch, with some 6-inch; the outfall was 12-inch but a 21-inch interceptor carries the flow to the treatment plant. Many of the sewer grades are very flat, giving theoretical velocities as low as 1.75 ft./sec. There were, therefore, many instances of deposits in them before the advent of the garbage grinders. "In general, there did not appear to be any deleterious effect on the sewers under observation as the result of the introduction of ground garbage. On the contrary, of the 16 sewers which were noted in April, 1950, to have sludge de-

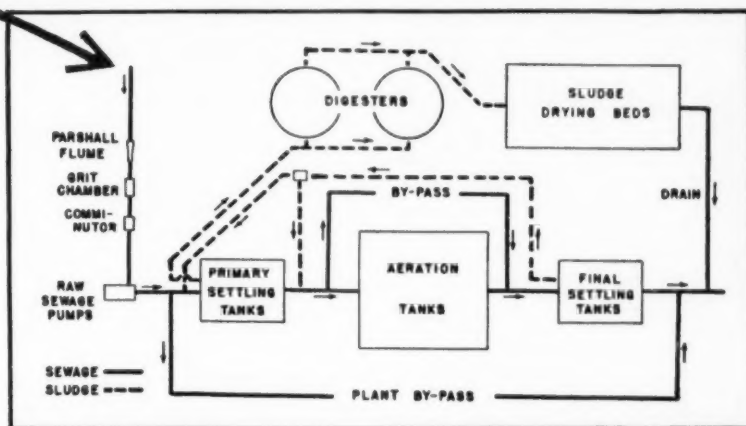
posits in them, 13 had either equal or lesser amounts of sludge in them in June, 1951. Five sewers showed increased deposits of sludge. In each case, upon investigation, it was determined that other factors not connected with the introduction of ground garbage were likely to have been the contributing cause."

Sewage Characteristics.—To determine the effect of the added garbage on the sewage characteristics, samples were taken in March, July, August and October, 1950, and May, 1951, hourly, on a continuous basis, for 8 to 14-day periods. These were collected as 24-hour composites. Analyses of these indicated that "the BOD contributed per capita by garbage alone has varied from 65 to 100 per cent of the sewage load. Suspended solids have varied from 0 to 100 per cent. Suspended volatile solids have varied from 20 to 90 per cent of the suspended volatile solids in the sewage." The increase per capita in BOD was from 0.12 to 0.18 pound. Peak BOD loadings were in the neighborhood

78 per cent). This was possibly influenced by characteristics of the grit chamber.

Treatment Plant.—In revising the original plans for the treatment plant so it would handle the ground garbage, the capacity of the aeration facilities were increased by 50 per cent; and the digestion tanks and sludge drying beds by about 60 per cent. Although the organic load has been up to expectations, the dry weather flow has been exceptionally low, with peak average daily flows only one-third of that for which the plant was designed. Average daily flow in Aug., 1950, was 0.309 mgd; in Oct., 1950, 0.240 mgd; and in May and June, 1951, 0.502 mgd.

The treatment plant was designed to handle an average flow of 1.0 mgd. Units of the plant are as follows: A 15-inch comminutor; a mechanically cleaned screen; two primary settling tanks, each 32 ft. by 15 ft., affording 1.55 hours detention, a surface rate of 1,040 gals./sq. ft./day, and weir overflow rate of 33,000 gals./ft./day; two final



● **FLOW DIAGRAM** of Jasper sewage treatment plant. The design changes provided for treatment of ground garbage affected primarily aeration and sludge handling units.

of 250 per cent of the average. The quantities of grease observed during typical dry weather periods averaged 0.07 pound per capita per day. The average concentration of ether-soluble materials was 161 ppm. Average BOD concentrations in the raw sewage ranged from 225 ppm when 8 per cent of the grinders were in use to 410 ppm when 72 per cent had been installed. During the latter period, the total flow was only 52 gpcd, based on connected population. The maximum 24-hour average observed was 647 ppm. The grit appeared to have unusually high concentrations of volatile solids (around 80 per cent) and a high moisture content (74 to

settling tanks, 40 ft. by 18 ft. by 10 ft., with 2.6 hours detention, a surface rate of 750 gals./sq. ft./day; three aeration tanks, 60 ft. by 20 ft. by 15 ft., total volume 54,000 cu. ft., providing 7.8 hours detention and aeration; two digesters, 40 ft. in diameter by 26 ft. deep, 68,750 cu. ft., providing 6.6 cu. ft./capita; and eight sludge beds, each 40 by 100 ft., providing 32,000 sq. ft. of area, or 3.1 sq. ft./capita. Design was based on a population of 10,500 in 1975. The plant is of the compressed air type.

As a result of interruptions in operation, and as is natural in starting a new plant, routine operation was (Continued on page 104)

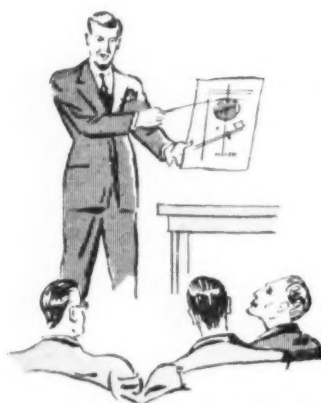
Speak up Mr. ENGINEER

CARL B. JOHNSTON,
Glendale, Calif.

SUPPOSE the position of head of your department were to be suddenly vacated today. Would you consider *yourself* eligible for the job? In reviewing your qualifications you would say, "My technical background is excellent. I'm thoroughly familiar with the office routine. I handle my own work with reasonable satisfaction, and I'm even studying a little at night to increase my 'book knowledge' for the next step up." But do you realize that as a department head you will be expected to speak for your department? You'll be responsible for the welfare of the people under you. You'll be the contact between the men in your department and those who determine policy on the next higher level. Ideas must flow both ways—from your men through you to "management", and from the top level down through you as the department head. In this position as a go-between, are you able to express yourself with ease at both levels?

As a general rule engineers are less proficient in self expression than in any other phase of their work. Yet it is necessary to express oneself forcefully even when asking for a raise; in showing your superior an improved method; or in selling approval of a project to a stubborn councilman. To gain recognition as a leader you will want to develop your ability to express ideas clearly, forcefully, and in a pleasant manner. Many fundamentals of self expression can be acquired in your daily contacts with others. You will want first of all to:

CULTIVATE A PLEASANT VOICE . . . you can't expect to "hold" an audience if your voice is raspy, monotonous or confined within yourself. Practice various tonal qualities in your daily speech and try enunciating clearly. Modulate your voice and let it bubble over with enthusiasm.



LOOK YOUR LISTENER STRAIGHT IN THE EYE . . . Direct all your attention to your listener if you want to put the point across. "Eye contact", like a firm handshake, instills confidence and holds interest.

DRAW THE OTHER FELLOW INTO THE DISCUSSION . . . State your arguments in such a way that the listener will nod his head in agreement and find it easy to go along with you. Consider his ideas carefully and try to work them into the conversation.

Most men in public work find that much of today's business is transacted in conferences and committee meetings. Here again, as a department head or perhaps as chairman of the group, you will need experience in self expression and conference procedures. When your turn comes to participate in a group meeting, remember that every meeting has a purpose. If the mere thought of conducting the meeting yourself gives you the "quivers", these suggestions will help:

STATE THE PURPOSE early in the meeting, so that all discussion can be aimed at accomplishing the objective.

KNOW THE SUBJECT . . . As leader of the discussion you are expected to be familiar enough with the problem to know where to find the necessary details.

CONSIDER THE AUDIENCE . . .

If the group is entirely unfamiliar with the subject you must explain from the very beginning. But to do so before an audience well acquainted with the problem invites boredom. Your approach must be based on how much the group knows about the subject.

HAVE A PLAN . . . This is probably the most important phase of the meeting, and one which requires preparation on the part of the leader. To insure progress in the right direction it is well to prepare an agenda in advance for distribution to the group. Details will depend upon the matter at hand, but your plan should take into account the factors discussed above—PURPOSE, SUBJECT, AND AUDIENCE. Knowing the SUBJECT, your plan should be to present it to the AUDIENCE in such a manner that the PURPOSE will be accomplished.

In your conduct of the meeting you will want to make good use of the self-expression principles you've been practicing—a pleasant voice, eye contact, and two-way discussion.

"Learning by doing" is today's approach to most training problems. Many organizations, realizing the value of training men in self expression, conduct their own practice courses in public speaking, personality development, and leadership. Such courses offer excellent opportunity for gaining experience among men whose objectives are the same as yours. In many communities young men desiring experience in group contacts join service clubs or organize their own neighborhood clubs to suit their particular needs. The world-wide non-profit organization Toastmasters International is devoted entirely to development of self expression among its members. The Toastmasters Club in your city will be glad to have you visit its regular meetings.

Whether your employer is a public agency, a corporation, or just an individual, you are judged by the way you present your ideas. When you speak for your employer both you and he want the impression to be favorable. If you want to move ahead, be prepared for the next step! Today's battles are fought not with swords and steeds, but with words and deeds! Speak up. Mr. Engineer!

LAWRENCE M. BAILEY,
 Supcrintendent, Water Dep't.,
 Lincoln Park, Mich.

Here are some photographs taken by our Police Department photographer showing some of our labor saving equipment at work. Picture No. 1 shows a Ford tractor with dual wheels, Dearborn Motors all-weather cab, Sherman power digger, Model 54-B-900, and Dearborn standard loader. This picture shows the tractor unit excavating for a stop box location, using the Sherman power digger with hydraulic control.

The operator excavated the stop box location in twenty minutes where hand labor would have re-



● FORD TRACTOR, Sherman digger and Dearborn loader work in a sub-division.

LABOR SAVING EQUIPMENT SPEEDS the WORK

quired upwards of four man-hours. Copper pipe is usually pushed from the excavation over the water main under the sidewalk to the stop box location with the use of a pipe pushing machine. If it is necessary to break the pavement the Department uses a Worthington Blue Brute air compressor. The Ford tractor with Sherman power digger is not only used for new work, but, also, to excavate where repairs to mains and service lines are necessary. Excavated clay from excavations in the street is loaded into a dump truck by using the Dearborn loader, and the excavated hole is refilled with sand from a chute built into the tail gate of a dump truck.

Another useful unit is a Ford truck with express body and Gar Wood winch mounted on the front of the chassis. The winch is operated by a power take-off. When it is necessary to work in rather close quarters, our experience has been that excavated earth is best replaced in the stop box hole by using a cable and slip scraper.

This winch comes in handy for other jobs, such as moving heavy fittings or pipe, or pulling other equipment when stalled or mired. In the foreground will be seen a Homelite two-inch pump which is used to pump the water from the stop box excavation, or from an excavation for main repairs.

Not shown here is our Dodge service truck with a 16-ft. body. This body is specially equipped with compartments for service crew tools. It can also haul water fittings, coils of copper pipe, and serve as a general duty unit.

We also have a number 2 unit, Ford Tractor with Sherman power digger, Model 49. This is an earlier model of the Sherman power digger, and it will not excavate as deep a hole as the first one described neither is it so flexible. However, this equipment had paid for itself many times over in labor savings. Our Department has installed around one hundred new services a month for a period of three years and our construction crew of six men could not possibly have accomplished the task without power equipment.

You will note that the newer unit is equipped for night operation, and flasher lights are used when operated on or near traffic arteries. We have two Homelite portable electric light units which can be set up for night operation, and if the wind is cold, or if strong winds are blow-

ing, we have portable framing for tarpaulins which serves as a wind break and shield for the men working on emergency jobs.

With the equipment described here we often handle main breaks with a two-man crew. Should it be snowing, the work area is cleared by dropping the bucket loader to the ground and using it as a pusher to clear the snow.

It is significant that in a new subdivision, the Water Department was able to maintain a construction schedule even with the development of the subdivision and construction of two hundred homes.

You will note from the picture, number 1, that the Sherman digger has a swinging boom. It is not necessary for the operator to move the tractor while excavating or while operating at a stop box location.



● THIS IS Picture No. 1. The tractor-digger-loader unit is digging for a stop-box.



● TRACTOR-mounted trencher is used to cut a trench along the road shoulder for longitudinal sub-drainage pipe.

1951 brought disastrous floods exceeding by far all known records. While 1952 was a good year to do all kinds of road work with scarcely no weather interruptions, the extremely dry weather brought up its own problems. Water necessary for compaction on base and subgrade reconstruction and low shoulder build up work, became quite a problem and all available water tanks were rounded up and mounted on rented and state-owned trucks. Large capacity semi-trailer road oil transports as well as bituminous distributors were used in this work when they could be spared.

Soils in Kansas are predominantly of heavy type, having a high vol-

HOW EQUIPMENT HELPS IN

L. J. SILER,

Engineer of Maintenance,
Kansas Highway Commission

THE Maintenance Department of the Kansas Highway Commission has had, in the past few years, the problem, common to many other public bodies, of obtaining and keeping capable experienced workers to carry on essential highway maintenance operations. This is due largely to the limitations on wages and other benefits to workers on public work, which results in our being unable to compete with private industry in wages, working hours, overtime and retirement and other benefits. This, together with the increased cost of manpower, such as it is, has resulted in our department resorting more and more to mechanization to increase man-hour production, and devising and utilizing special equipment wherever possible.

This is especially true in emergency repair work and in cases of unusual and special maintenance problems.

As an example, during 1951, Kansas suffered very heavy damages from floods and it would have been impossible to make the necessary repairs with state owned equipment and the state's own forces within a reasonable time. It was not practical to let contracts for this work due to the delay in preparing plans

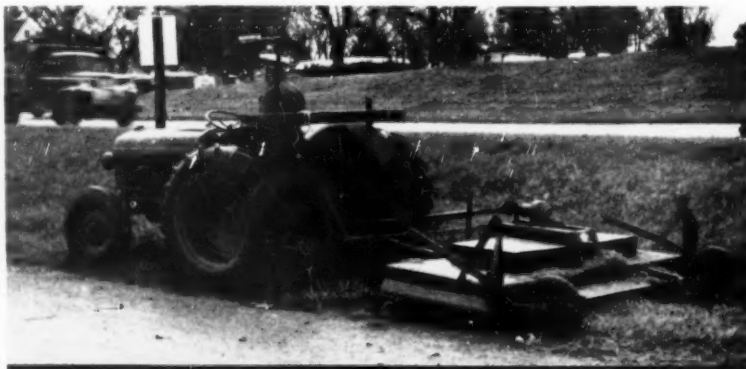
and advertising lettings, therefore equipment such as bulldozers, motor graders, wheel scrapers, rollers, shovels, cranes, pile drivers and trucks, were rented from contractors on an hourly rental basis fully operated. The work was carried on daylight-to-dark shifts, necessitating considerable overtime pay. The state has no provision to pay overtime rates, so rental rates paid to contractors were computed to include these overtime rates, making it possible to work long days. This repair work amounted to several hundred thousand dollars and the job was done in weeks whereas, it would have taken months by other methods.

The past year of 1952 contrasts sharply with the previous year, in that 1952 will probably prove to be the driest year on record whereas,

ume change depending on moisture content. The extremely dry weather resulted in high shrinkage of soils creating a serious problem in low shoulders and cavities under pavement edges and joints that normally would have a fairly high moisture content.

Elevating grader attachments to motor graders, belt-type travel loaders, and front end tractor loaders were used to load trucks to build up shoulders and a 1½-cu. yd. four wheel drive front end loader was purchased and used very effectively on concrete and bituminous surface types.

We have a considerable mileage of old narrow concrete roads that have been widened with asphaltic concrete. Soil shrinkage caused the widened portions to settle. It is contemplated to purchase some small



● ROTARY-TYPE mower having a cutting width of 80 inches is being tried.

● A MACHINE ordinarily used to place bituminous widening material is adapted for placing coarse aggregate in trench.

portable asphalt mixing machines, with dryers, suitable for handling hot asphaltic mixes, to level up the low edges with this material.

Subgrade shrinkage under joints in concrete pavements developed cavities which will aggravate pumping when normal rainfall returns. This has brought acceleration of mud jacking operations and a new method of jacking has been experimented with. This method consists of boring a hole about two feet from the joint on the low side under the slab and pumping through a pipe inserted into the hole from the side. A plank, through which this pipe passes, is placed along the edge of the pavement to pump against. Some



ESSENTIAL MAINTENANCE

difficulty was experienced because the slurry tended to pump out along the plank but it is believed that this can be overcome by using a sealing material between the plank end and the pavement. The advantages of this method are that equipment can be kept off the traveled way and the traffic over the joint seems to be beneficial in distributing the slurry while being pumped. More experimenting will be necessary to speed up the work but it has promise and is likely to prove advantageous.

Bases and mats that are not full width of the roadway and have been shouldered with earth are showing serious settlement at the edges and it is believed that, when rains do come, that water will be pocketed with further damage to subgrades along the edge of the base. To overcome this, longitudinal

drains with transverse outlets are being placed along each shoulder on a considerable mileage of this type of road.

Trenching machines have been rented to cut a trench twelve inches wide and to a depth just under the bottom of the base. Into this trench 6 to 8 inches of coarse gravel is placed and filled over with earth. A machine used by contractors to place bituminous material into the widening trench on bituminous base widening jobs, was adapted to place the aggregate in the trench accurately and without hand labor.

Hot top asphaltic surfaces placed over old concrete pavements, of which the state has a considerable mileage, have a tendency to follow irregularities in the old pavement and this develops quite a maintenance problem. A heater planer was

purchased with which the surface can be softened and planed to remove irregularities very successfully. This machine, followed by a light power blade and roller, has been kept busy constantly on this work the past season.

Highway Mowing

Mowing of highway right of way is an important maintenance item as there are probably over 70,000 acres of roadside area on the Kansas state highway system to mow. Conventional sickle-bar mowers, both tractor mounted and pull type, have been used and the upkeep on these mowers is difficult and very costly. During the last year the horizontal rotor type mowers have been experimented with, and it is believed that the maintenance on this type of machine will be only a fraction of the sickle-bar type. Rear tractor mounted, hydraulically operated machines 80 inches wide with two rotors, and 60-inch wide machines with one rotor, have been used. Belting was placed at the bottom of the machine to prevent throwing tin cans and other debris.

Advantages of this type of mower are low maintenance cost, faster operation and ability to mow shoulders without operating in the traveled way. A smoother and even job of cutting is also done. These machines, however, cannot cut steep slopes, narrow ditches, or very rough areas and they do not do so well when weeds and grass have grown very high.



● HEATER-PLANER and light blade grader remove irregularities on surfacings.



★ SEWAGE PUMPING STATION ★

is in the COUNTRY CLUB SET

AN attractive brick house on a tree-shaded, grassy corner plot is one of the showplaces of the country club district of Fairway, Kansas, residential suburb of Kansas City. The adjoining homes sell for \$20,000 and up and, though No. 5700 cost a lot more, it blends nicely and unpretentiously with the neighboring dwellings. The Fuller brush man, home seekers and many of the newer neighbors don't know it yet, but No. 5700 is a sewage pumping station with three pairs of pumps handling an average of 3,000,000 gallons of sewage a day.

The large and rapid expansion of suburban areas near Kansas City has necessitated combined effort to meet such problems as sewage disposal. Mission Township Main Sewage District No. 1 includes the incorporated cities of Countyside, Fairway, Mission, Mission Woods, Prairie Village, Roeland Park and Westwood and such unincorporated communities as Brandhurst, Mission Highlands, Oberlin Park and many more. In 1945 the district's 8,000 acres had a population of 11,500 and plans were drawn for a sewage gathering system, pumping station and treatment plant designed to serve 15,000 people.

No one anticipated the tremendous influx which raised the district's population to an estimated



● **BRICK BUILDING** shown at top of page gives little clue as to its actual purpose in life, but handles sewage from 36,000 people. Above: No. 5700 fits well into the country club section.

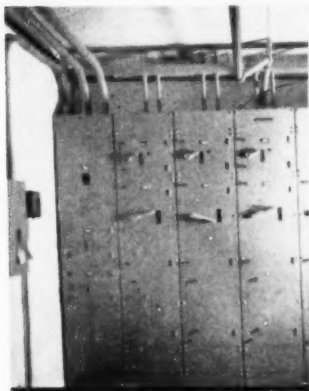
36,000 in 1951. The system planned for 15,000 people somehow managed to serve until plans were drawn to duplicate facilities and double capacity.

In planning the original system, one major problem was location of the main pumping station. The logical place for it was the lowest point in the district where gravity could be utilized as much as possible in gathering sewage. It happened, though, that this low point was in the midst of Fairway's attractive residential district, the country club

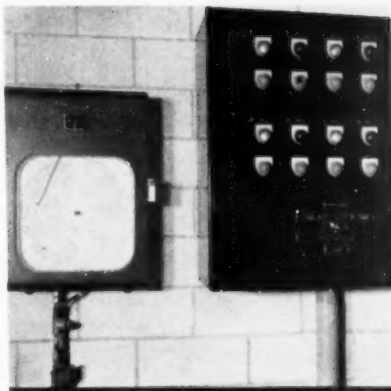
section near the Mission Hills and Kansas City Country Clubs. Erection of the usual type of sewage station here would depreciate property values and arouse serious opposition in the neighborhood.

The solution to the problem was a masterful piece of architectural design which successfully camouflaged the sewage station and made it a positive asset to the community in appearance as well as utility. The red brick building with the shingled roof and white shutters houses modern pumping and control equipment and does its job unobtrusively and efficiently. All 8,000 acres of the district are served by this plant. From some points, lift stations are needed to get sewage to the main pumping station and there are three lift stations in service with a fourth planned. The rest of the area is drained by gravity.

Sewage enters the main pumping station through a mechanically-cleaned bar screen (from which screenings go to a grinder), then flows to a wet well where it is picked up by the pumps. The sewage is handled by three pairs of 5-in. Fairbanks - Morse sewage pumps each rated at 1400 gpm at a 78-ft. head. Each pump is driven at 1150 rpm by a 40-hp. FM electric motor. The two pumps in each pair work in series. From the dis-



● **ALTERNATE** power sources are provided at the switchboard.



● **STATION** control panel is in "foyer." Sequence switch controls pump operations.

charge header, the sewage is pumped through 11,000 ft. of 16-in. high-pressure, cast iron line to the top of a hill from which point it flows by gravity through 3100 ft. of 24-in. sewer to the treatment plant. Treatment includes trickling filters, separate sludge digestion, final settling and chlorination. The gate valve at the pumping station is at an elevation of 862 ft., the end of the force main is at 980 ft. and the disposal plant is at 974.25 ft.

No One Lives There

No one lives at No. 5700, not even a sewage plant operator. The station is completely automatic in all normal operations. Pumps are started and shut down by a float control in the wet well which runs one or two pumps as the load requires. Only two pumps are needed to exceed the designed capacity of the plant, leav-

ing the third as a standby unit. Provision was made in design for rotating use of the pumps. By turning a switch on the control panel, it is possible to designate any one of the three units as the standby, leaving the other two to carry the load.

There are one or two pumps in operation virtually all the time since the 150 miles of sewer in the system are rarely pumped down to a point where the last pump stops. In unusual circumstances, all three pumps are needed and the third can be started manually in case of need. During one period of heavy rains, all three pumps ran continuously above rated capacity for more than three weeks.

To provide electric power for this important pumping operation, there are two power company lines into the plant. If the preferred source

fails, the load is switched automatically to the other line.

In designing this plant, Black and Veatch, the consulting engineers, and county and district authorities made provision for expansion. Space was provided for two more sets of pumps and the control equipment was designed to handle the additional units. This permits doubling the normal capacity with one unit still in reserve. A new 13,-700 ft. force main will handle the increased volume.

Operation of the sewage system is under the direction of Myron K. Nelson, Chief Engineer of Main Sewage District No. 1. Policy control is exercised by the Johnson County, Kansas, Board of County Commissioners comprising M. J. Ziegler, chairman, L. R. Penner and George Russell. Mr. Nelson reports that the lady who lives next door to No. 5700 says the plant is the best neighbor she ever had. It is indeed a good neighbor and a valuable servant to all this large and populous district.

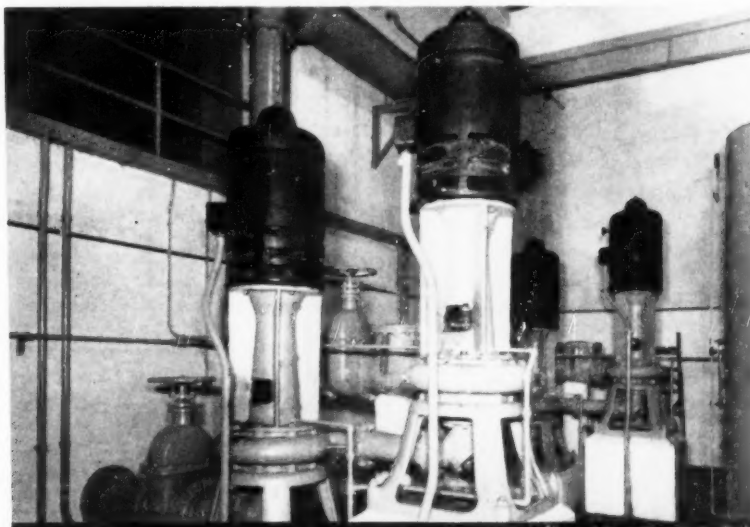
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Charging Merchants for Rubbish Collection

JOHN HUBEL

FOR many years the City of Milwaukee, Wisc., has collected rubbish from stores and business establishments, often making no charge for the service, except as such charge appears in the tax bills. However an ordinance of many years standing has required payment for such services, but it has not been generally enforced. As a result, income from rubbish removal from commercial establishments has aggregated about \$10,000 a year—far below the cost of the collection services rendered, which has been estimated at about \$100,000 annually. In one ward, a total of only \$1.50 was collected for this service during an entire year, allegedly as a result of political activity on the part of the alderman.

The ordinance has now been revised and merchants must pay for rubbish collection on a cubic-foot basis. This regulation applies to department stores, smaller stores, taverns, bakeries, filling stations and other business and commercial establishments. The rate is \$3.30 per 22 bushels per collection. Most of the larger department stores hire professional rubbish collectors under annual contract.



● **THE BUSINESS** end: Three pairs of FM sewage pumps can handle 4200-gpm.

PLANNING GAVE PORTLAND



● BULL RUN lake, with Mt. Hood in rear, fed by springs, has no surface outlet.

GUY BROWNING ARTHUR

THOUGH it is important, the size of the water system in Portland, Oregon, is not its most arresting feature. The city was incorporated more than 100 years ago, in February, 1851, and it now has 416,757 inhabitants in an area of 67.5 square miles. Deliberate long-distance planning from the very beginning, with competent engineering counsel, is the principal feature of this metropolitan system—one of the great plants in the West, and in the country as a whole.

A few figures will show the extent of the system. The average daily consumption is slightly over 59 mgd, of which about 6 mgd go to 57 water districts outside of the city. There are 1,219.3 miles of water mains, carrying an average pressure of 80 pounds, but ranging from 20 to 125 psi. There are six storage reservoirs drawing from a protected watershed of 102 sq. mi. This watershed is in the mountains and water is brought to the city through three conduits. The total investment is \$30,000,000.

The present system, owned by the city, had its start in 1887, when a "Water Committee," authorized by the legislature in 1885, purchased the old Portland Water Company which had been serving the community since 1857. Since this is a timber country, it is not surprising that the first mains were bored logs. The water came from Caruthers Creek. This "first" plant was sold to the Portland Water Company for the spectacular sum of \$5,400.

densing engines which could deliver 16 mgd.

It will be stimulating to all employees of water departments to learn that the Clerk of the new Water Committee, organized in 1885, was given a salary of \$100 per month. Also, engineers may get a lift from the employment of Isaac W. Smith as the Engineer at \$400 a month. But it seems from the record that the Water Committee retreated from this stand for munificent salaries, for in 1887 it reduced the clerk to \$50 a month, and made Mr. Smith the superintendent of the plant, as well as engineer, at \$250 monthly. Mr. Smith remained with the city for seven years. He em-



HEADWORKS of the Portland Water System, with spillway at left, and in the foreground, an old by-pass channel.

It was not as easy to sell water to Portland citizens as in many other small places, for the city is underlaid with thick layer of gravel saturated with water. Anyone could drive a well from 20 ft. to 100 ft. deep and get clear, cool water. But the people learned after a while that this water was causing sickness because of drainage from the steadily increasing number of dwellings.

In 1868 a Worthington pump with a capacity of 1.8 mgd was installed in a new and bigger station, and another Worthington in 1876, bringing the output up to 4 mgd. Then in 1884 an entirely new pumping station on the river was equipped with two Worthington compound con-

ployed and trained Charles E. Oliver, who became his successor, and stayed on the job for 36 years.

In 1886, at one of its first meetings, Mr. Smith proposed that a permanent source of pure water be developed on the Bull Run River, which has its source in Bull Run Lake, 30 miles east of the city in the Cascade Mountains, at an elevation of 3,175 feet. His survey indicated that the lake is not fed from the glaciers on Mt. Hood, a notion which persists even today. Instead, it is fed by innumerable springs, small creeks, and lakes. It has no surface outlet. The outflow goes down under a mass of volcanic basalt, and comes out in a series of large

A GREAT WATER SYSTEM

springs about a mile down the canyon at an elevation 175 feet below the lake level, forming the Bull Run River.

The lake is $1\frac{3}{4}$ miles long, $\frac{3}{4}$ mile wide, and 50 feet deep. The average depth of snow in the winter at the lake is 10 feet; and 12 feet in the surrounding mountains. Precipitation from snow and rain averages about 145 inches. When it was certain that the city had legal power to construct an entirely new system, it took steps to control the watershed containing 222 square miles, or 142,000 acres.

The most distinctive characteristic of the Portland water system must be pointed out. In 1885 the

more. It side-stepped plans to pay a high price for existing properties which would never be adequate, or satisfactory as to the purity of their water. It went to the Congress of the United States to have the watershed protected from all contamination. It employed an engineer of outstanding ability and proved experience, and trusted him fully in the exercise of his professional service. His reports and recommendations were considered with respect, and weighed with business acumen. His skill, backed by the sagacity of city officials, won the support of the legislature, so that bonds could be issued. The bonds, because of this sound planning, sold without diffi-

culty, and earned good revenue.

In 1892, President Benjamin Harrison set aside the entire watershed as a public reserve, containing 222 square miles, or 142,000 acres. Within this reserve the Bull Run watershed covers 102 square miles, or 65,300 acres. Trespassing and grazing of stock are prohibited by an act of Congress.

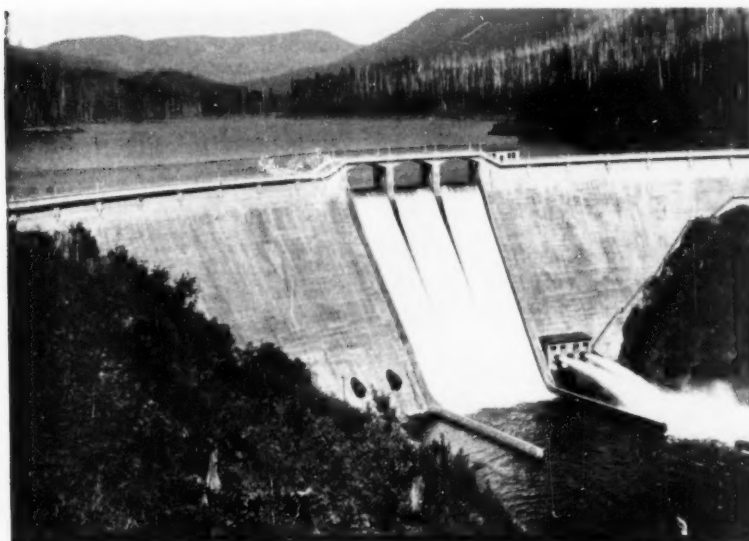
The gravity dam at the headworks is 40 ft. high, and feeds the water into three conduits, respectively 42, 52, and 58 ins. in diameter, which carry the water 24 miles to reservoirs on Mt. Tabor, at an elevation of 412 feet. The three conduits have a combined capacity of 149 mgd. The headworks are 20 miles downstream by way of the river from Bull Run Lake.

When it became clear that the storage of water in the reserve should be increased, steps were taken to build another dam, which was completed in 1929. This is a concrete gravity structure 200 ft. high and 950 ft. long on the crest. It was placed across the river canyon at a point five miles above the headworks. The made lake, named for Ben S. Morrow, Water Works Engineer, is $3\frac{1}{2}$ miles long, and stores 11 billion gallons. The dam cost \$3,000,000.

The Tough Fraction

An ideal water system for Portland would be entirely by gravity flow. Since the primary source, Bull Run Lake, is about 3,150 feet higher than Harbor Drive, which runs on the first bench above the river, this

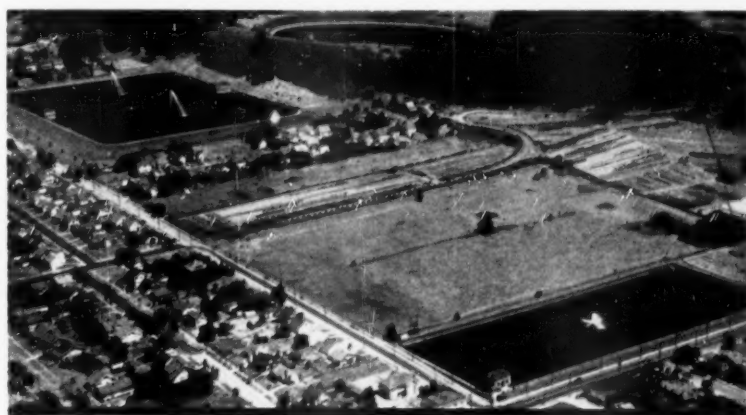
(Continued on page 80)



● DAM AT Lake Ben Morrow backs up water in Bull Run River for $3\frac{1}{2}$ miles, stores 11,000,000,000 gallons of water. Construction of the dam cost \$3 million.

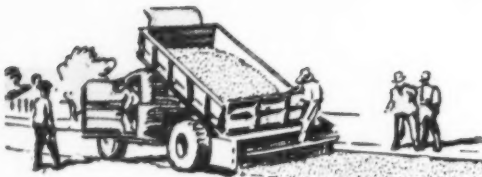
city had about 31,000 inhabitants. Water problems had not yet become demanding in any of our large cities. Knowledge of the accompaniments of growth, knowledge of the broad effects of wholesome water, community hygiene, scientific study of source watersheds, consummate engineering skills applied to water problems, and methods of treating various waters to make them suitable for human use: These, as we know them today, were in the future.

With foresight and courage, continuing today, the city administration moved to control a watershed capable of supplying good water for a population of 2,000,000 or



● RESERVOIRS on Mt. Tabor have elevation of 412 ft. and serve most of the city.

Organizing A PROGRAM



JOSEPH F. BASE,

City Manager, Santa Clara,
Calif., formerly Ellensburg, Wash.

IN order to prepare a constructive street rehabilitation program, we made a general observation survey, covering all of the streets in our city. We did not use any objective scoring system for the survey. Instead, we relied on inspection and report by our engineering personnel. The survey was made as soon as the snow had disappeared—early in March. The resulting ranking of our streets into five categories was made on the basis of the combined observation and judgment of two trained observers.

As a result of this survey, and the grouping of the streets into specific categories, we were able to prepare a map on which our streets were shown as follows: Streets now beyond repair, in pink; streets requiring patching and resurfacing, in green; streets needing crack-filling a seal-coating, in blue; streets where shoulder and gutter improvement and seal coating were needed, in brown; and streets needing no work, without color.

The streets on which work was necessary were then arranged by type of work needed, also into five groups: (1) Seal coating of paved streets; (2) stabilizing shoulders along paved streets; (3) reconstructing treated and untreated gravel surfaced streets; (4) constructing incidental drainage; and (5) oiling unimproved streets. The work to be done was then fitted into the street reconstruction and maintenance budget of \$85,000.

As a first dividend of our study and our color map, the "patchwork" nature of the surfaced street system showed up clearly, emphasizing the lack of continuous through routes, either east-west or north-south. Since correction of this condition was considered one of our major needs, it was decided to schedule improvements so that at least a few of these streets would be continuously improved throughout.

The Seal Coating Program

Seal coating work was concentrated on the main streets in the business area for the purpose of conserving the asphaltic concrete surfacing applied in previous years. Also, in this section, gutter areas were surfaced and curbs and curb returns were rehabilitated to insure a more presentable appearance.

The seal coating was applied to about 45,600 sq. yds. of street. Treatment consisted of 0.33 gal./sq. yd. of hot RC-3 and 20 lbs./sq. yd. of stone chips, $\frac{3}{8}$ -inch minus. The cost of this work was about 12 cents a square yard. The gutter areas in this section were surfaced with 2 ins. of asphaltic concrete; and the same surfacing was applied to 630 sq. yds. of alley returns, from the gutter line to the property line. This work was done by contract by the Columbia Asphalt Paving Co. of Yakima at a total cost of about \$11,500.

Shoulder Improvement

On some streets there were satisfactory pavement surfaces approximately 2 lanes wide along the center of the street; but the areas between the pavement edges and the curb lines were in poor shape, even

though gravel and crushed stone had been placed in the past. It was decided to scarify the existing material between the pavement edge and the curb to a depth of 4 to 6 ins., to blade it to a uniform gradation and consistency, to reshape it to the new cross-section and, after rolling, to apply about 0.5 gallon of hot MC-2 and then build up a penetration-type wearing surface about $1\frac{1}{2}$ ins., thick. As our construction season here is relatively short, we are planning this work as part of the 1953 program.

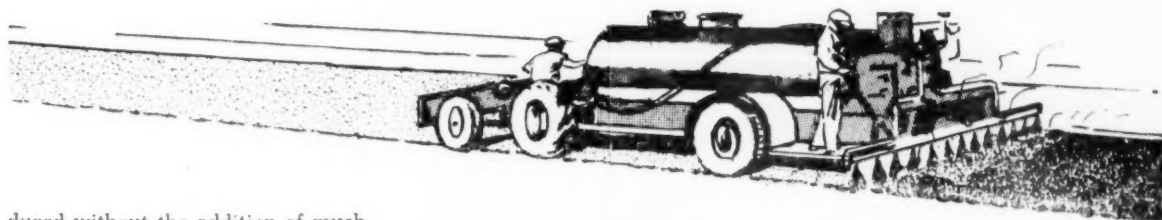
Reconstructing Gravel Streets

Spreading gravel or crushed stone on our roadway surfaces year after year, often with some asphaltic treatment in addition, has resulted in the gradual build-up of a surfacing of varying thickness and composed of aggregate of varying sizes. To conserve this valuable material while reconstructing the street, it was decided to scarify and rework it. As a preliminary, we scarified several typical blocks and made sieve analyses to determine the gradation of the aggregate present. These analyses indicated that a satisfactory surfacing could be pro-



● IN THE business area of the city. Seal coating has been applied to the existing asphaltic concrete, stone chips have been spread, and rolling is now under way.

for STREET REHABILITATION



duced without the addition of much more aggregate. The surfaces were scarified to a depth of 4 to 6 ins., the scarified material mixed and shaped with a blade grader to the proper cross-section, additional material added where necessary, and rolled. After prime coating this base, a penetration type bituminous wearing surface about 1½ inches thick was applied. By proper shaping of the road section, it was possible to provide a system of gutters along these streets to carry off storm water. Rainfall is light in Ellensburg, averaging only 9 ins. per year, so that large drainage structures are not necessary. Short drain lines of 6-inch and 8-inch concrete pipes, with suitable inlet structures, were provided where necessary.

Work of this nature was planned to cover a total of 57 blocks at an estimated cost of \$39,800.

The city did not own equipment suitable for doing much of the work contemplated in our program. It did have personnel and some equipment suitable for minor asphaltic concrete patching, crack filling,

drainage work and scarifying and blade-grading. As no funds were provided for the purchase of much-needed equipment for carrying on our program, we conducted a salvage campaign among the several departments of the city. We disposed of over \$7,000 of unneeded items and junk. We then purchased a new 600-gallon distributor, a spreader box, a used air compressor, and a used tandem roller. To date, our own crews have reconstructed more than 30 miles of graveled streets at a cost of 35 cents to 50 cents a square yard, exclusive of equipment charges and overhead costs.

Storm Drainage Facilities

In addition to the other work, some storm drainage facilities were required, despite our light annual rainfall. Except possibly along the more important streets, short 6-inch drains across intersections were believed adequate. In other cases, short pipe drains carry surface water di-

rectly from street intersections to natural outlets, as creek channels. We have set aside in our program about \$8,350 for improving drainage. This work is done ahead of, or concurrent with, the street improvement program.

In some sections of the city, streets are entirely unimproved, except for occasional shaping with a motor grader; and oil has been applied as a dust preventive in some cases. We believed that oiling to prevent dust nuisance should be included in our maintenance program as a service to our residents on such streets. Our program included oiling more than 6 miles of such unimproved streets at a cost of about \$4,500. Treatment consisted of applying 0.25 to 0.33 gal. per sq. yd. of RC-1 oil over a width of 24 ft. along each street to be treated. Traffic is permitted on the street after 2 hours. No covering of stone chips or sand was applied to the surface before opening to traffic.



● EXISTING roadway surfaces were scarified, sieve analyses were made to determine aggregate gradation, the road shaped and a wearing surface added.



● APPLYING stone chips to the seal coat for the new wearing surface.

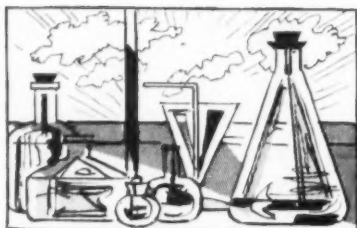
DUAL PURPOSE SEWAGE TREATMENT PLANT PROVIDES RESEARCH FACILITIES

TO treat the sewage from its new Colmar plant at Lansdale, Pa., Link-Belt Company has designed and constructed a dual purpose sewage treatment plant. Primarily its job is to treat the domestic sewage from this newest of Link-Belt's plants; but another important function will be to test new ideas and new equipment and to solve old problems in sewage treatment. To aid in this phase, a chemical laboratory has been installed at the plant and this will be used for analyzing and testing industrial wastes, permitting their better treatment. The Link-Belt Colmar plant does not produce liquid industrial wastes, hence only domestic sewage is treated.

The new plant is highly modern. It is of the 2-stage biofilter or high rate filter type. The design population is 1,400 day shift employees with a per capita flow of 90 gpm, or about 92 gpd each. Sludge digestion capacity is also provided for an additional 600-man nightshift. Principal elements of the plant are a hand-cleaned bar screen with 1-inch clear openings; a distribution box which permits diverting all or part of the flow to either primary or secondary units and is especially designed to facilitate handling small weekend flows; a primary settling tank, equipped with a Link-Belt straight-line sludge collector, which provides 2 hours detention; two 25-ft. diameter high rate filters, 4 ft. deep with PFT distributors and TFFI underdrains; a secondary settling tank the same size as the primary and at the same elevation, also with straightline collectors; a chlorine contact tank providing 30 minutes detention; and an unbeated sludge digester equipped with a Link-Belt scum breaker.

Unusual Features

There are many unusual and interesting features of this plant, which was designed by J. J. Gilbert, well known sanitary engineer and Manager of Link-Belt's Sanitary Engineering Division. First, perhaps, is the "uniflow type of settling tank that is used. Experimental



work during the past two years by Link-Belt in conjunction with James L. Dallas of the Massachusetts Department of Health has indicated that a settling tank with a depth that decreases rapidly toward the outlet end and with multiple effect weirs will give superior results. In this plant, both primary and final settling tanks have been designed for this rapid slope bottom. The primary tank is of the uniflow design and the secondary tank is constructed with a false bottom so that it can easily be converted to a similar design. This arrangement offers an exceptional opportunity for studying the two types of settling tanks in a single installation under exactly similar conditions.

Aeration and Filters

Since it was also desired to check the value of preaeration, porous air diffuser tubes have been installed at the influent ends of both settling tanks, permitting comparison of operating results with and without aeration.

The filters are 25 ft. in diameter and 4 ft. deep, with PFT distributors and TFFI specification underdrains. Stop plates are provided at each filter discharge manhole so the filters can be flooded if desired. These are so designed as to flood only to the top of the stone layer and to permit flow through the filters to continue during flooding. This design also prevents overflow of the filters. Filter design, based on 1400 daytime and 600 night-shift employees at 0.10 pound of BOD per person, provides a loading of 2.0 pounds of BOD per cubic yard of media.

Flow to the filters is by pumping, using Chicago Pump equipment. The effluent from the primary tanks enters a small wet well. This effluent, at design flow, totals 270 gpm. It is made up of 90 gpm raw sewage flow plus 180 gpm return from the primary filter to the primary settling tank. From this primary wet well 180 gpm is pumped to the primary filter, giving a surface application rate of about 23 mgd. The remaining 90 gpm passes over a weir to the secondary wet well. The pump in this secondary wet well delivers 180 gpm to the secondary filter, utilizing the 90 gpm overflow from the primary well and drawing 90 gpm from the secondary settling tank. The effluent from the secondary filter goes to the influent of the secondary settling tank, the flow through which is normally 180 gpm. The 90 gpm not drawn by the secondary filter pump flows to the chlorination contact tank, and thence into Neshaminy Creek. A Wallace & Tiernan manual control chlorinator, 25 pounds capacity per 24 hours, is used to maintain a residual of 0.4 ppm. Baffles in the chlorine contact tank are of wood.

When Neshaminy creek is high, gravity discharge from the plant is not possible. A Chicago Pump Co. float-controlled pump with a capacity of 180 gpm is provided to discharge the plant effluent during high water periods.

A V-notch weir at the effluent of the chlorine contact tank maintains a nearly uniform level in the tank and is used also for measuring the flow through the plant.

Sludge can be withdrawn from the settling tanks either intermittently or continuously into a sludge pit which is provided with an air diffuser unit. Provision is made so that this aerated sludge can be returned to the influent ends of either or both settling tanks; or it can be pumped, with or without aeration, to the digester. This digester is a rectangular tank equipped with a straightline scum breaker which is operated intermittently at a speed of 1 fpm. The digester provides 6

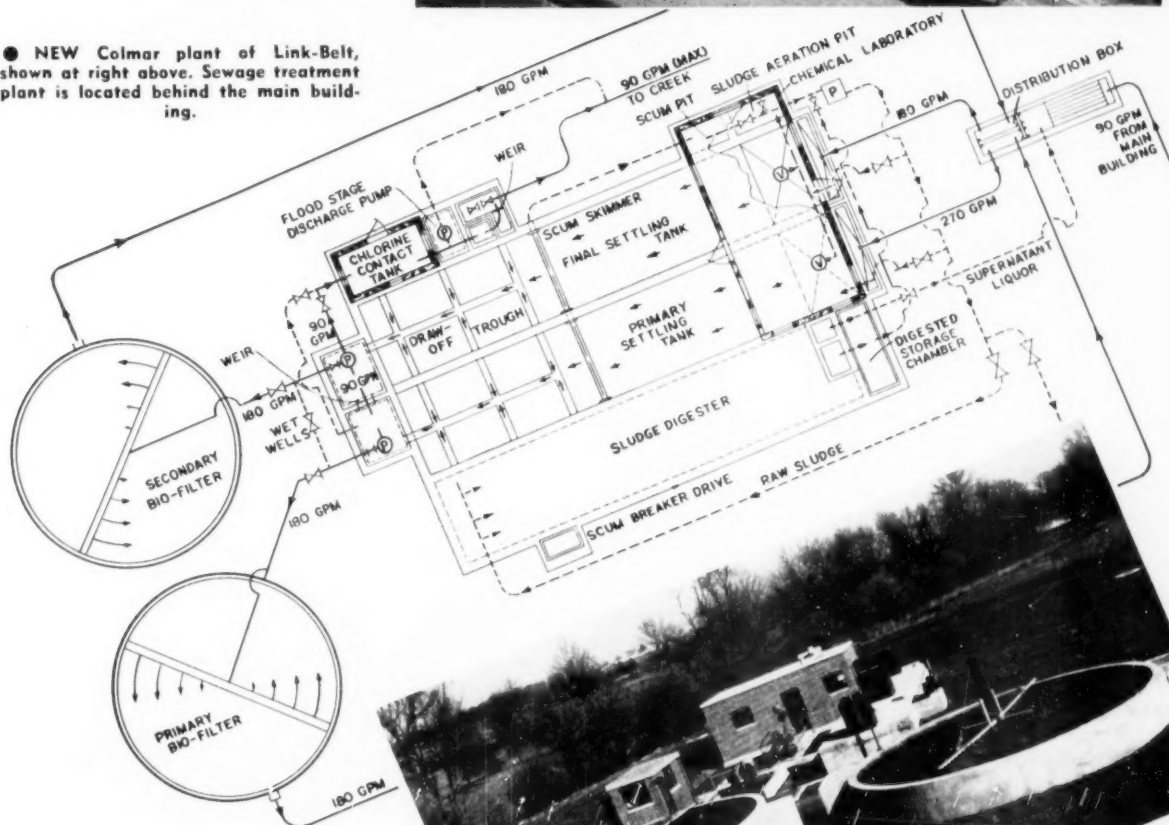
cu. ft. of capacity per capita and is unheated. Sludge pumps are also by Chicago.

Scum skimmers are provided for the settling tanks. These are Roto-line type, of 8-in. diameter pipe. Discharge of scum is to the sludge pit.

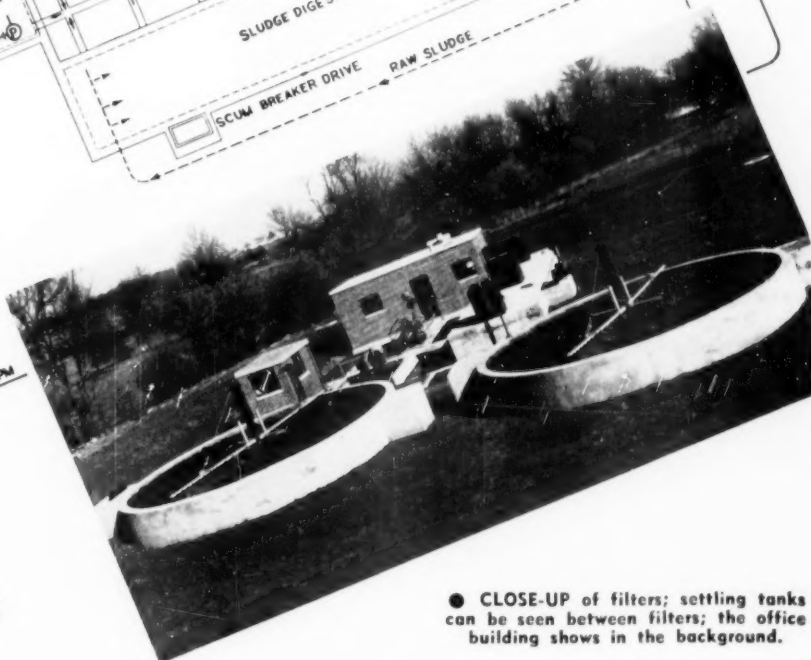
The plant has been designed so that its capacity can be doubled, if necessary. Aside from its basic use for treating the domestic sewage from this new and highly modern industrial plant, Link-Belt sanitary engineers have a full-scale model plant and laboratory in which to develop and test new techniques and new ideas. In addition a chemical laboratory, completely equipped for industrial waste disposal studies has been provided in conjunction with the plant, permitting better design of equipment to treat such wastes. Laboratory equipment was furnished by Fisher Scientific Co.



● NEW Colmar plant of Link-Belt, shown at right above. Sewage treatment plant is located behind the main building.



● PLAN OF dual-purpose sewage treatment plant. It treats plant wastes and doubles as research establishment.



● CLOSE-UP of filters; settling tanks can be seen between filters; the office building shows in the background.

GARBAGE and REFUSE COLLECTION and DISPOSAL in OHIO

OVER the past two years, the Division of Sanitary Engineering of the Ohio Department of Health has surveyed garbage and refuse collection in all of the 121 cities in that state which have populations in excess of 5,000. Most of the work was done by L. J. McCabe and S. M. Overman, and the following data were abstracted from the final report which was sent us by George H. Eagle, Engineer in Charge of General Sanitation.

The survey program included visits to the municipalities; conferences with local municipal and health officials; preparation of detailed reports on conditions; transmission of recommendations to municipal officials; promotional and advisory assistance in initiating improved operation; and follow-up visits.

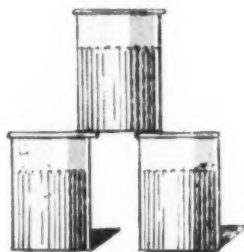
Storage on Private Premises

Ordinances regulating the storage of garbage on private premises are in force in 103 of the 121 cities, but these ordinances are not always adequately enforced. Galvanized corrugated sheet metal containers with tight-fitting covers, and with capacities ranging from 10 to 30 gallons, are most generally required. Requirements for the storage of refuse other than garbage vary considerably. Many cities make no differentiation between garbage and refuse. As to number of containers required, a few cities specify the number, but most of them provide only for "sufficient containers to hold all waste between collections."

In rating the premises in respect to storage, 26 per cent of the cities were given a "good" rating; 18 per cent were "fair"; 25 per cent were "poor"; and 31 per cent were "very poor."

The basic step for a good storage program is a dependable collection service of adequate frequency. To get and to keep public cooperation, it is essential that the collection forces be taught to handle containers properly and not to run over them, bang them up and fail to replace covers.

One city put on a successful waste improvement program. Following a



series of articles in local papers, non-regulation or worn-out containers were marked "condemned" with stickers furnished by a container manufacturer. Hardware stores were advised to have plenty of containers in stock. In a few weeks, storage conditions had improved materially and collection costs decreased remarkably as storage conditions became better.

Collection Data

Slightly over half of the cities, 62 of 121, have municipal collection services for garbage and about 44 per cent of them also provide municipal service for the collection of refuse other than garbage. In addition, 12 cities have contract collection and 41 cities have private collection, which is described as "in effect, these cities have no bona fide collection service."

Garbage collection services are financed from the general fund in 49 cities, by a service charge in 65, by a special levy in 4, and by a combination of methods in 3. Other refuse collection services are financed from the general fund by 35 cities, by a service charge in 79, and by other methods in 7 cities. All private collection is financed by service charges.

The coverage of garbage collection service, that is the percent of premises where regular garbage collection service is maintained, was found to be as follows: All premises served, 53 cities; 80 per cent to 100 per cent served, 10 cities; 60 to 80 per cent served, 18 cities; and under 60 per cent, 40 cities. Coverage for refuse collection other than garbage was, for the same categories, 38 cities, 10 cities and 73 cities.

It was the general rule that cities having municipal collection service had good collection coverage, and this was especially the case where collection was financed from the general fund. The average coverage in cities having service charges was about 65 per cent. Frequency of collection varies greatly. There was some evidence that, if storage regulations are good and are strictly enforced, weekly collections in residential areas and daily collections in business areas will be sufficient. Separation of wastes depends on the method of disposal.

The most common deficiency noted in the collection programs was the failure of cities to regulate private collectors or to have any set standards of service which they are required to maintain. Cities which have municipal collection systems financed by service charges, need all the revenue they can get, yet many of them allow private collectors to operate in an unrestricted manner.

Incineration for garbage only, with dumps for all other refuse, is used by 11 cities, all over 10,000 population. Combustible wastes are incinerated in 20 cities, with all non-combustible wastes going to the dump. Garbage is fed to hogs in 55 cities. Sanitary landfill is used for garbage only in 2 cities, and for all wastes in 10 cities. Everything is placed on dumps in 23 cities. Thus 78 of the 121 cities use dumps exclusively or feed garbage to hogs. The open dumps were found "to be getting very little attention except when located in populated areas around large cities, in which cases some degree of maintenance was forced by public demand."

Collection costs were found to range from \$5.63 to \$9.12 per ton. Disposal costs ranged from 55 cents per ton for the sanitary landfill operation to \$2.68 per ton for incinerator operation. The overall cost of collection and disposal for all garbage and other refuse cost from \$2.18 to \$2.82 per capita per year.

Seven cities are reported to have set up satisfactory collection and disposal systems since this information was gathered.



● CONSULTING engineer, I. M. Glace, Jr., points to architect's drawing of the new sewage treatment plant for New Cumberland.

RENTALS FINANCE SEWER SYSTEM AND TREATMENT PLANT

I. M. GLACE, JR.

Glace & Glace, Consulting Engineers,
Harrisburg, Pa.

EIGHT years ago the Borough of New Cumberland, Pa., received an order from the Sanitary Water Board directing it to cease polluting the stream into which its wastes were discharged, and to prepare plans for sewage collection and treatment. The war was still the major national activity at that time and no immediate steps were taken to comply with the order.

Some five years later our firm was retained as engineers, but in the meantime a New Cumberland Sewer Authority had been created to finance, construct and lease to the city the necessary sewer system and treatment works. Butcher & Sherred and Leo M. Dolphin Company were employed by the Authority as fiscal agents; and Morgan Lewis and Bockins as bond counsel. These, with the engineer, prepared the details of financing the construction and operation of the plant.

Design Data

The Borough contains 820 acres; elevations range from 300 ft. to 475 ft. and grades are mostly adequate. One area required a pumping station since it could not be reached by gravity lines. The 1940 census showed a population of 4,525; and the 1950 census 6,186. The design population within the Borough

limits was fixed at 9,020. Within the drainage area but outside the Borough limits were an additional potential 3,860 people and in the Highland Park area some 2,000 more could be expected. The water consumption as of 1949 was 62 gpcd. For design purposes, a sewage flow of 100 gpcd was adopted, giving a total of 1.5 mgd. Infiltration was assumed at one gallon per day per foot of sewer or 150,000 gpd. The total flow for sewer design was thus fixed at 1.65 mgd.

Bids were advertised and contracts awarded. Construction was finished late in 1951—well ahead of

the deadline of June 1, 1952, fixed by the Sanitary Water Board. The contractor was Intercounty Construction Corporation Hyattsville, Md., whose bid on the sewer system was \$849,875.38. This work included 2,732 ft. of 18-in. vitrified clay sewer; 3,075 ft. of 15-in.; 2,395 ft. of 12-in.; 12,849 ft. of 10-in.; 77,360 ft. of 8-in.; and 21,323 ft. of 6-in. Also included were 20 6x15 branch connections, 50 6x12, 228 6x10 and 1,439 6x8 connections.

The sewage treatment plant is of the primary type and is designed to remove 35 per cent of the biochemical oxygen demand. Clarifier mechanism was furnished by Link-

Belt; the digester mechanism by Dorr Company; the comminutor and sewage pumps by Chicago Pump Co.; and the chlorinators by Wallace & Tiernan.

Financing

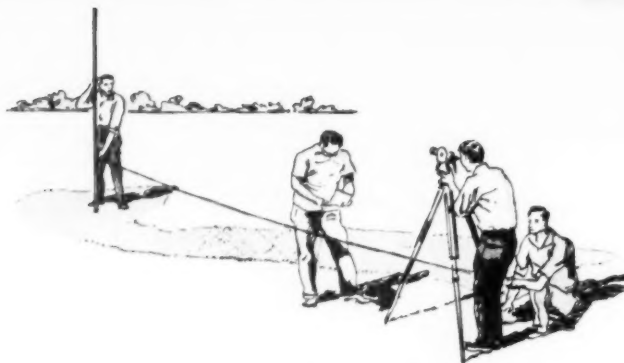
The bond issue was set at \$1,450,000 to cover construction costs; legal, fiscal and engineering fees; interest during construction; lands and rights-of-way; and a reserve fund. The debt service and amortization for the years 1957 to 1990 inclusive, were estimated at \$78,238.82 annually. It was assumed that all sewer connections, about 2,300 would have been made by 1957.

Other annual expenses were estimated at \$19,520 per year, based upon costs for personnel, maintenance, upkeep, power and supplies for the sewer system and treatment plant. The total annual costs thus aggregated \$97,758.82. A sewer rental charge was established on this basis of need which will bring in an anticipated \$97,881 annually.

The treatment plant is so designed as to permit easy enlargement in case additional flows of sewage are brought in from the adjacent areas, which are suburban in nature. The sewer system design is also based on this possibility, provision being made for connections to sewer lines from areas which are future potential contributors. The present treatment plant is designed for a population of 7,000 persons.



● NEARLY 100,000 ft. of vitrified clay pipe were laid in sizes 6 to 18-in.



TRAINING SCHOOL COMBATS ENGINEER SHORTAGE

EARLY in 1952 the Vermont Department of Highways was faced with the acute shortage of trained engineers to carry along the construction and maintenance programs. This shortage was due primarily to the keen competition of private industry in the matter of salaries and to the demands of military service for young men. Because of this situation, fewer engineering graduates than usual could be recruited from the engineering colleges.

In an effort to ease this shortage to some extent the Department decided to inaugurate an engineer training course of its own, training men with a high school education for engineering work. The Department, working with the State Personnel Department, set up specifications for the position of Apprentice Engineering Aide. These specifications established an age range between 17 and 30, graduation from high school, preferably in the upper 50% of the class, and successful completion of at least one year each of algebra and plane geometry; and required a definite interest in the civil engineering field.

Candidates for the positions were subjected to an examination set up by the Personnel Department. Of the 20 applicants taking the examination, 14 received a passing grade of 70 or over and these successful candidates were referred to the Department of Highways. They were interviewed by the Office Engineer, who acts as Personnel Officer for the Engineering Department, and two instructors who were employed for the summer by the Department. The instructors were Dr. Myles McConnon, head of the Department of Mathematics at Norwich University, and John Bisbee, a graduate student of the University of California. From the 14 successful candidates, 12 were selected to take the initial course, which began late last July.

W. B. McALLISTER

Administrative Assistant
to the Chief Engineer
Department of Highways,
Montpelier, Vt.

The objective of the four week intensive formal course was to provide a basic knowledge of the engineering principles used in highway operations, including trigonometry and plane surveying. Classroom instruction was conducted daily Monday through Friday from 8:00 to 11:45 A.M. and field class work was conducted from 12:45 to 4:30 P.M.

Text books selected for use were: Ballou and Steen "Plane and Spherical Trigonometry" and Rubey, Lommel, Todd "Engineering Surveys". The course was supplemented with films on highway engineering.

Following the formal phase of the course, the trainees have been as-

signed to further training under the supervision of the Department's engineers with survey parties, in the testing laboratory, with the design section and in the field on construction. It is contemplated that the seven trainees who successfully completed the course will be alternated in the several fields of highway work so as to give them experience and to enable the Department's supervisors to determine in which field they are best suited.

The salaries paid to the trainees during the entire period of training is dependent upon their background. Those trainees who had just graduated from high school and without experience were started at a salary of \$28.60 per week and, at the end of the four-week formal training period, were advanced to the next grade, paying \$32.10 per week. At the end of the first six months of field training they will be advanced another grade, paying \$39.00 per week. When these trainees have had

(Continued on page 103)



● VERMONT'S engineer-in-training class gets some book work—see text above.

HOW AUSTIN Paves streets with its own crew



WHEN more than 10,000 vehicles per day pound a 30-year old brick and asphalt street, maintenance costs may exceed the limit. This happened in Austin, Minnesota, several years ago.

So, in 1949, the city council put a plan in action to pave these streets with concrete. They decided to finance the project with city taxes and assessments of property along the paved streets. The plan was made to cover a five-year period. This meant that each year, for five years, between 10 and 15 blocks would be paved with concrete. The city engineer was given the right to decide which streets should be paved, and which ones to pave first.

In paving, when the old concrete base under the bricks is in good condition, it is left in place and resurfaced with 4 to 5 inches of concrete. This layer is reinforced with 6 x 6 wire mesh embedded in the slab. If the old base is poor, it is removed, and new 8-inch pavement is laid. Four 11-ft. panels are made to give a 44-ft. street. The old streets are usually 36 ft. wide, so this requires widening 4 ft. on either side, and placing new curbing. Both the resurfacing and new paving are done according to Minnesota Highway Department specifications, and a set of plans are drawn each year.

Starting the Work

Like many cities, Austin has an ordinance that requires certain work to be done by contract. In 1949, a contract was let to pave Main Street, which carries U. S. Highway 218 traffic. This job received state aid. In 1950, the paving was limited to streets off the highway, and was almost entirely a resurfacing job. Since only 4-inch sidewalk forms and hand pulled screeds were required, the job was more like maintenance work than new construction. City crews were given the job because

PAUL R. HOFFMAN

no special machinery was needed.

Not until last year did the project become extensive. In 1951, Austin paved 12,000 sq. yds. with 8-inch slab and resurfaced a bridge over the Cedar River. It surprised other southern Minnesota towns by doing the job with a rented machine and city employees.

A complete set of plans and specifications for construction were drawn, and city engineer, George Brown, advertised for bids. Contractors were uneasy about taking such a job, and only one bid was received. This was rejected because the contractor had no equipment. So Austin decided to do the paving with its own crew.

First, a bid was let for excavating the old pavement because city equipment was needed on other jobs. Another contract was given to Austin Ready-Mix Concrete Co. for concrete. All that was left for the engineers was to assemble equipment and men for the paving process and carry on the work.

Equipment Needed

The biggest pieces of equipment needed were forms and a finishing machine. The city engineer purchased 2000 ft. of used 9-inch forms. A Lakewood Road Finisher was rented from a Twin-Cities supplier and was set to finish an 11-ft. width. But when the machine was delivered, it was too heavy to move. The railway type wheels sank in the subgrade, so a pair of rubber tire truck wheels were mounted on an angle iron welded to the frame. When the crew wanted to move the machine, all they had to do was jack it up, put on the wheels, and roll it into position. Then the wheels were removed, and the machine was ready to go. No special skill was required to operate it, only a little mechanical ability.

Reinforcing steel for dowels was purchased from steel suppliers, and cut to the required length on the job. Several hand screeds, one with a gas engine vibrator, were on hand from the previous year. While the excavation was starting, the crew made darby floats, hand floats, and a 14-ft. longitudinal float. They also built two rolling bridges from railway push car wheels and 2 x 8 lumber. These rolling bridges were an important factor for speedy construction.

Air hammers, picks, shovels, pails, brushes, and other small equipment were already on hand in the city warehouse. Water was supplied from city hydrants along the streets.

Four skilled cement finishers were hired for the paving operations. The rest of the crew consisted of men with experience as carpenters or cement workers, while students from local high schools and colleges filled in as unskilled labor.

Excavation

The excavation contractor used a $\frac{3}{8}$ -yd. shovel, and loaded the old pavement into 5-yd. dump trucks. He removed the old pavement on a sq. yd. basis, and the widened section on a cu. yd. basis. He hauled the excavated material to an approved dumping area. The excavator took everything, trees, sidewalk, and curb, leaving little cleaning up for city crews. Since the engineer located buried cables, pipes, and vaults, the contractor encountered very little trouble. Thus, he was able to keep well ahead of the paving crew.

Grades were set in advance so that the excavator was able to keep within 1 or 2 inches of the proposed subgrade. After he finished, the subgrade was wetted, and a sheepfoot roller was used to compact it. Where the old base was broken, much of the old concrete was mixed into the soil underneath. This gave a solid soil-cement quality to the subgrade. A street department blader was used to bring the base to grade.

The city surveying crew set line

and grade stakes. A stake was set every 25 ft. and at each intersection. A line of stakes was used for each line of forms. Since the forms were 9-inch, the form setting crew had to dig a channel 1 inch deep to lower the forms so that the slab would be 8 inches thick.

An expansion joint was provided at every intersection. Usually, the intersections were paved separately, but sometimes the forms were set through the middle panels of the intersection. Then the paving could be continued through. A dummy header was used to place the expansion material in this case, with a 2 x 8 for the header. The expansion material was held against it with stakes in the desired position. When the concrete was poured and puddled around the header, the 2 x 8 was pulled, leaving the expansion material standing alone.

Special forms were used for intersections, and odd lengths were filled in with 2 x 8 lumber.

Aggregates and Concrete

Samples of coarse and fine aggregate and cement were taken at the batch plant. The samples were sent to the Twin Cities Testing and Engineering Laboratory which sent back a trial mix for 4000 psi and 5000 psi concrete. These mixes were for 2 to 4-inch slump and 4½ per cent air. A flexural strength of 550 psi after six days was required. These requirements were reached in the 4000 psi concrete by using 6.1 bags of cement per cu. yd., and a water cement ratio of 5.30 gals. per bag of cement. The air content was provided by using daretex.

The Austin Ready-Mix furnished a room and equipment for the plant inspector. He ran moisture determinations of the sand and gravel, and made batch calculations.

At the job site, the concrete was tested for slump and air content at 100-ft. intervals. A standard waterless air meter proved to be superior to the old water type meter for making air content tests. Air content was held to almost exactly 4½ per cent by adjusting the daretex slightly at the plant. Strength samples were made on each panel poured. A 6 x 6 x 36-inch flexural sample and a 6-inch cylinder were taken at various places during the day. These samples were cured in a tank of 70° water until ready for testing. A standard beam breaker was used to test the flexural samples and cylinders were sent to the Twin Cities Laboratory.

The use of ready-mix concrete and the 11-ft. panel proved very

satisfactory. The truck mixer could go down the adjacent panel, dump its load by chute, and drive out the other end. In this way another mixer could follow right behind. Each mixer carried 2½ cu. yds. so the job moved at 100 ft. per hr.

The action of the screed on the finishing machine made hand work almost unnecessary. Only two men were needed, one on either side, to pack the concrete along the keyways and fill in low places in front of the screed. Two men placed removable dummy joint knives for contraction joints. Two cement finishers followed on a rolling bridge with the longitudinal float. These men also edged the concrete along the form, and pulled a burlap drag over the surface for the final finish. Burlap gave a more pleasant appearance than brushing, and at the same time provided necessary roughness. Before the burlap was pulled, the job inspector placed a 10-ft. straightedge on the slab to test its smoothness. Any deviation over ¼ inch was repaired by adding or removing concrete with the floats. Curing was accomplished by spraying with a wax base compound which proved very satisfactory.

An interesting feature is the resurfacing done on the Water Street bridge. The base is 7-inch concrete,

in excellent condition. The biggest problem was with form setting. The form setter first set his chalk line, then placed the 4-inch sidewalk forms in line where he wanted them to go. He marked the exact position of the stakes through the corresponding holes in the form. The forms were removed, and an air drill was used to bore a hole deep enough to hold the stakes. Keyways used in this slab were triangular pieces made by cutting a 2 x 2 diagonally. Wire mesh reinforcing was placed in the slab with 5000 psi concrete because of the reduced thickness. The two side slabs on the bridge were finished with a hand pulled screed. The finishing machine could not be used, since these panels were only 9-ft. wide.

The city crew replaced drive-ways and sidewalks that had been removed. A local contractor built new curb after the paving was done. Before the new pavement was opened to traffic, the contraction joints were sealed with asphalt joint sealer.

Although contractors handled excavation, concrete delivery, and curb construction, the big part of the job was handled entirely by a city crew under city supervision. Engineers expected to spend more than the contractor's bid because most of the 12-man crew was unskilled. However, after costs were totaled, they beat the contractor by 11 per cent. The contractor's bid was \$4.50 per sq. yd. for constructing new 8-inch pavement. The city crew did it for \$4.02, which included the cost of equipment. An important reason why the cost was kept down is that delays were eliminated. Plans could be changed without causing disagreement.

Austin's people are satisfied with the job. The riding quality of the new pavement is equal to the quality that any contractor can produce. Besides producing a smooth riding surface, the new pavement has eliminated a traffic problem. The 44-ft. width provides faster traffic flow through the business district. The concrete also gives a cleaner appearance to the street. The spring thaw this year proved that the maintenance problem has been eliminated.

Now that Austin has proved that street paving can be profitable, more contractors are becoming interested. That is why a contractor is doing the paving in Austin this year. They'll continue to do it by contract too. It takes a highly skilled city crew to beat contractors' costs when there is good competition.


Maintaining Surfacing Over Bridge Expansion Joints

In many places there has been a problem in maintaining asphalt surfacing over steel expansion plates at joints on bridges. Breaking off of the asphalt is now prevented by welding steel grating to the expansion plates. The asphalt mix is then placed on the grating, which holds it firmly. This method was developed by C. L. Gleason, Construction Engineer of the Iowa State Highway Commission and by the engineers of the Irving Subway Grating Co.

• • •

Ohio Law Governs House Trailer Parks

Under a law recently passed by Ohio, all trailer house parks must be licensed by local or district Boards of Health and prior to licensing the operator must submit and get approval for water supply, sewerage and drainage facilities. A complete sanitary sewage system must be provided and each house trailer must be properly connected to such a system.

<p>VICE PRESIDENTS MILTON OFFNER EDWARD P. DECHER RALPH C. GRAHAM WARREN A. COOLIDGE</p> <p>PAST PRESIDENT EDWARD J. CLEARY</p>	<h1 style="margin: 0;">A P W A</h1> <h2 style="margin: 0;">news</h2> <p style="margin: 0;">AMERICAN PUBLIC WORKS ASSOCIATION 1313 EAST 60TH ST., CHICAGO 37, ILL.</p>	<p>DIRECTORS J. J. DEAN SOL ELLENSON GEORGE G. HYLAND JEAN I. VINCENZ</p> <p>TREASURER ALBERT G. WYLER</p>
<p>ALLAN H. ROGERS, President</p>		<p>DONALD F. HERRICK, Executive Director</p>

Modern Street Lighting Design

BACK in the early years of the 16th Century, Catherine DeMedici, wife of Henry II of France, caused a statue of The Virgin to be erected at each street intersection in Paris. Tallow was placed in the palm of the hand of each figure and the wicks were lighted each night to illuminate safely home those whose business or social pursuits made it necessary to be on the streets after dark. After a time the statues became grimy and lack of maintenance of the illuminant lead to the abandonment of this, the first street lighting system.

Two and a half centuries later, in 1878, Chas. Brush of Cleveland, Ohio, introduced his arc lamp system, and in 1880 another pioneer in electric lighting, Elihu Thompson of Philadelphia, brought out his arc lamp. In 1892, the carbon arc lamp was developed and a few years later, the so-called arc lamp appeared. These became more efficient with the development of the magnetite arc by Dr. Steinmetz about 10 years later.

In 1885, a young genius, Thomas A. Edison, having developed the incandescent lamp, adapted it to street lighting. Starting with 16 and 32 candle-power lamps, improvements were made until at the present time tungsten gas-filled lamps of 15,000 and 25,000 lumens are widely used in modern lighting. A more recent type of luminaire uses mercury vapor lamps of 15,000 to 20,000 lumens; and a recent contribution to better night lighting is the fluorescent street light, which is still in the pioneer stage.

There are approximately 4.5 million street lamps now installed, but many of them are now obsolete and inadequate under present American

Prepared by W. A. Porterfield, Vice-President in Charge of Sales Promotion, Union Metal Manufacturing Company, Canton 5, Ohio, for discussion at 1952 Public Works Congress.

Standard Practice. A survey of the paved urban streets in the U. S., made early in 1952, disclosed that only 10% were lighted in accordance with the Illuminating Engineering Society Street Lighting Recommended Practice, issued by their Street and Highway Lighting Committee in 1947.

As a result of increased nighttime automobile traffic and inability of the driver and pedestrian to see under the old "horse and buggy days" type of street illumination, it became the problem of the lighting engineer to develop more efficient luminaires and have them properly placed—high enough above and over the street surface to avoid glare and to distribute properly sufficient light to make the streets safe.

According to reports of the National Safety Council there were 37,100 persons killed and nearly two million injured in traffic accidents in 1951; of these, 21,000 persons, or 57% of the total, were killed during the night hours (6PM to 6AM); 6,600 of these night traffic deaths occurred in urban areas while only 1/3 of the traffic operated. This was 66% of the total urban deaths.

Can adequate street lighting decrease this horrible killing? Studies made late in 1951 by the Street and Traffic Safety Lighting Bureau, Cleveland, Ohio, over a 12-month period, show that night traffic fatalities were reduced 93.6% by modernizing street lighting in 18 cities.

Inadequate lighting has much to do with auto theft—since the peak of auto thefts is reached after darkness sets in. It is cheaper to pay for modern lighting than to pay for losses from stolen cars and damaged cars. Modern street lighting is a necessity in this era.

Overall Plan A Must

To insure satisfactory results and save money, a master plan for street lighting modernization for the en-



● AN EXAMPLE of good lighting is shown by this installation in Dayton, Ohio.

tire community is necessary. Such a plan results in more efficient and effective lighting, prevents possible political and sectional favoritism, and permits the overall cost to be calculated in advance, and a time schedule to be laid out. Such a plan also assures that streets and areas most in need of improved visibility will have preference; and from that point, the improvement can be expanded to include the entire project, as funds are made available.

As an aid to analyzing the problem, a large city map is commonly used. Usually, studies can best be made by or in cooperation with the Municipal Planning Board, the City Engineering Dep't., the Police Dep't., and the local Electric Utility. Street lighting specialists from such concerns as Westinghouse, Line Material Co., General Electric Co., Union Metal Mfg. Co., and others are available to work with an engineering group in this planning stage.

Factors Affecting Design

In designing an installation that will economically provide the maxi-



● MODERN standard in Philadelphia.

mum in traffic safety and crime reduction at night, the following factors should be fully evaluated:

1. Traffic: Character, speed and volume of vehicular traffic and pedestrian traffic.
2. Type of Street: Classification according to its principal use; width of street and sidewalk.
3. Buildings: Predominating type and character of use.
4. Public Transportation Facilities: Buses, trolley coaches or street cars.

(Please turn to page 74)



Presented in cooperation with the American Public Works Association
and through the courtesy of the
Washington Office of the American Municipal Association.

DPA Grants More 1st Quarter Steel

Approval of the distribution of an industrial 1.48 million tons of carbon steel products to meet pressing industrial needs during the 1st quarter of 1953, and to assure maximum steel production, has been announced by the Defense Production Administration. Of the 1.48 million tons, approximately 1.4 million were allotted by DPA to NPA Industry Divisions on the basis of applications already submitted. In the case of civilian goods industry divisions in NPA, additional 1st quarter 1953 steel is to be distributed on the basis of submission of supplemental 4-B applications.

The distribution was sponsored by NPA Iron and Steel Division, following a recommendation by the Steel Products Advisory Committee on NPA, which estimated at a meeting on October 27, that 1.48 million tons of certain steel products would be available during the first three months of next year.

DPA specified that the supplemental allotments granted to each claimant agency, or an individual metal user, must show the amount of each type of steel product authorized, in order to utilize open capacity and prevent procurement of the scarcer steel forms and shapes.

NPA's 1.4 million-ton share of additional steel provides, division-wise, proportionate increases of from one to 50 percent. NPA pointed out, in announcing receipt of the allotment, that it will be re-allotted by the agency on the basis of the ability of the individual manufacturer to use those shapes for which open mill capacity exists.

DEPA to Aid Municipal Electric Utilities

James Fairman, Defense Electric Power Administrator, announced that it will now be possible to re-

quest directives on steel mills to accept or expedite delivery on orders for electric utility projects. If difficulties develop along this line which cannot be solved by municipalities, assistance will now be rendered by DEPA. A form DEPA-20 requesting assistance should be filled out promptly following procedures set forth in Industry Letter 20; and priority and expediting aid can be obtained.

Requests for information about materials for major plant additions and minor requirements should be directed to the Defense Electric Power Administration, Interior Bldg., 18th and C Streets, N.W., Washington 25, D. C. The following listing contains the names of key "contact" people in the Administration: Telephone is REpublic 1820; extensions are as given below:

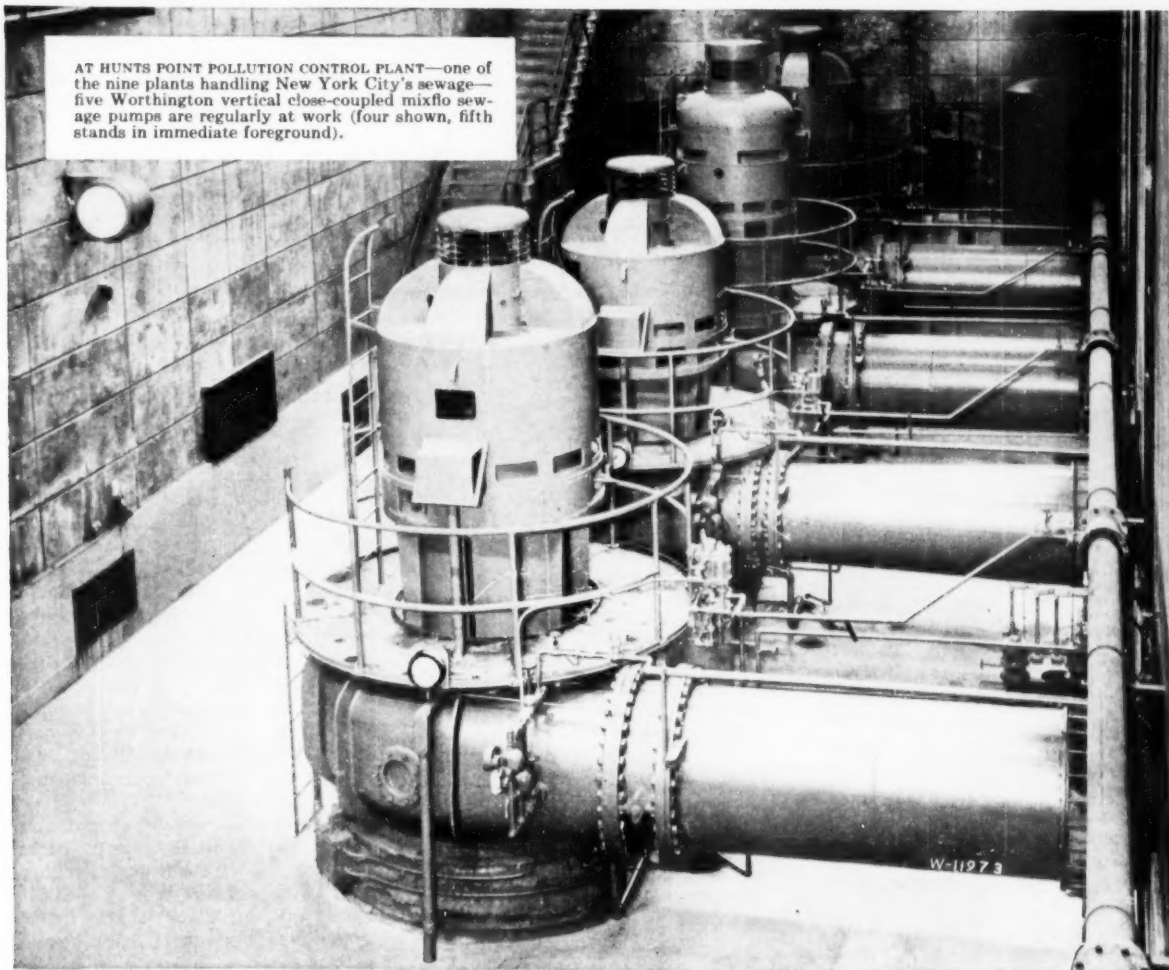
Quota and Inventory Section: Minor requirements quotas and M-50 inventory allowances. (Note: This does not include specific applications for rating authority to purchase equipment items costing over \$10,000 for minor requirements projects, which were formerly handled by the Minor Requirements Branch. These will now be handled by the Generation, Transmission and Distribution Sections, as applicable): Archie L. Sills, Ext. 5385.

Generation Section: Applications (major plant additions and equipment items costing over \$10,000 for minor projects) involving a generating plant: A. A. Boettcher or Gardner C. George, Ext. 5216.

Transmission Section: Applications (major plant additions and equipment items costing over \$10,000 for minor projects) involving lines above 35 kv and substations having a high side voltage above 35 kv: Eduard Fritz, Jr., Ext. 5385.

Distribution Section: Applications (major plant additions and equipment items costing over \$10,000 for minor projects) involving lines operating at or below 35 KV and sub-

AT HUNTS POINT POLLUTION CONTROL PLANT—one of the nine plants handling New York City's sewage—five Worthington vertical close-coupled mixflo sewage pumps are regularly at work (four shown, fifth stands in immediate foreground).



1689 mgd of New York City's Treated Sewage handled by Worthington pumps

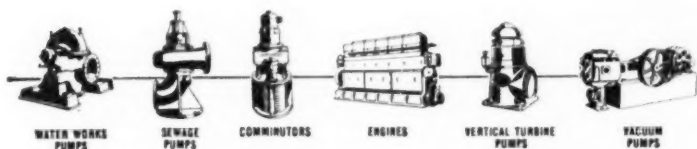
If you want to see Worthington sewage pumps—large and small—at work, you can't go wrong by looking inside six of the nine major disposal plants that serve the City of New York. A total of 1689 mgd installed capacity of Worthington sewage pumps are now in regular use in the world's largest city.

New York's installed capacity of sewage pumps is among the largest in the U. S., so you'd naturally expect the city's public works officials to be familiar

with Worthington performance—performance that years ago gave Worthington its position as world leader in the manufacture of pumping equipment.

Hundreds of smaller municipalities across the country know Worthington, too, not only for sewage pumps but for water-works pumps, comminutors, engines and other public works equipment. *Worthington Corporation, Public Works Division, Harrison, New Jersey.*

W 2.3



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stations having a high side voltage of 35 kv or below: Paul M. Black, Ext. 5385.

Information on a particular case should be obtained directly from the appropriate section as listed above. Interpretations of policy or information on other matters of general nature should be obtained from: Henry F. Hansjergen or Merle E. Sutton, Ext. 5216.

APWA

(Continued from page 72)

5. Trees: Presence or absence of trees; height and spread of foliage; trimming and regulation of growth.

6. Crime: Street crimes; holdups and assault; rape; building or residential illegal entry.

By checking records of traffic accidents and street crimes in the community, this information can be plotted on the map to indicate dangerous points and streets to which priority should be given in the plans.

In classifying the streets to determine the minimum quantity of light required to effect reduction of night deaths and accidents, it is recommended that the "American Standard Practice" sponsored by the IES be used. The Vehicular Traffic Classification is: Very light, 150 per hour; light, 150 to 500; medium, 500 to 1200; heavy, 1200 to 2400; very heavy, 2400 to 4000; and heaviest, over 4000 per hour. The Pedestrian Traffic Classification (that is, pedestrians crossing vehicular traffic lanes) is: None, as on elevated or depressed roads or on expressways; light, as on residential streets or in warehouse areas; medium, as on secondary business streets; and heavy, as on main business streets.

Minimum Light Intensities

The recommended light intensities for each street, based on its vehicular and pedestrian traffic volume, in average horizontal foot-candles are: Less than 150 vehicles per hour, 0.2 fc for light, 0.6 fc for medium and 0.8 fc for heavy pedestrian traffic; 150 to 500 vehicles, 0.4, 0.6 and 0.8 fc for light, medium and heavy pedestrian traffic; for 500 to 1200 vehicles, 0.6, 0.8 and 1.0 fc for light, medium and heavy pedestrian traffic; and for 1200 or more vehicles per hour 0.8, 1.0 and 1.2 fc for the three volumes of pedestrian traffic.

On important retail business streets, the complexities of vehicular and pedestrian traffic, plus other

business activity, usually require a higher intensity of illumination. Scores of existing installations already range from 2 to 5 footcandles.

The next step in planning will be the selection of the type of luminaire, mounting heights and spacings to give the proper distribution of light on the street surface.

The principal manufacturers of luminaires have developed units directing the light down onto the pavement and sidewalk but shielding the light from house windows. The modern luminaire provides approximately a rectangular pattern of maximum uniform pavement brightness. Properly surrounded with a suitable diffusing media and mounted under the American Standards recommendation, discomforting glare to the motorist and pedestrian is minimized.

While in general a rectangular pattern is best suited for most roadway applications, there are some conditions where a different pattern is more advantageous. The Illuminating Engineering Society has set up five recognized light distribution types.

Type I is a two-way distribution intended for center-of street mounting for streets, 25 to 30 ft. wide, as residential or lightly traveled streets and industrial area roadways. The mounting height recommended is 25 to 30 ft., with 10 to 15-ft. overhang to place the luminaire near the street center. The installation is generally designed for 0.2 foot-candle illumination. The poles may be staggered or placed on one side of the street, with upsweep brackets.

Type II is a narrow, asymmetrical pattern included for side-of-street mounting for streets, 30 to 50 ft. wide. These, with medium vehicular and pedestrian traffic, usually have luminaire mountings of 25 to 30 ft. with 4 to 8-ft. overhang from the curb by means of upsweep brackets. A minimum of 0.8 foot-candle illumination is recommended.

Type III distribution is somewhat broader and intended for side-of-street mounting on streets, 40 to 60 ft. wide, as secondary business streets with heavy vehicular and medium pedestrian traffic should have a minimum of 1.0 foot-candle. The luminaire mounting from 25 ft. to 35 ft. should be on upsweep brackets to give 4 to 8 ft. overhang from the curb, and placed opposite.

Type IV is the broadest asymmetrical distribution for use on the widest primary business streets, 50 to 100 ft. width, with both heavy vehicular and pedestrian traffic.

Mounting heights should be 30 to 35 ft., with upsweep brackets to give 4 to 8-ft. overhang from the curb, with opposite arrangement. Minimum of 1.2 foot-candles is recommended, but in many installations 2 to 5 foot-candles are preferred.

Type V is the normal, symmetrical distribution most useful for center-of street mounting at intersections. Mounting height is generally 25 to 30 ft. with a minimum of 1.2 foot-candles. In many cases, the sum of values recommended for two streets forming the intersection is found safer.

Standards, Circuits and Lamps

The selection of lighting standards or poles usually depends on where the lighting system is to be installed. For downtown installation, arterial traffic streets, and in residential areas unsightly wood poles detract from the surroundings, and steel, concrete or aluminum poles should be recommended. In far outlying locations, wood poles may be used.

The use of series or multiple operation is a choice of the planner. Dependable lamp performance, ease of control, and lower copper cost because of a single wire loop, generally gives series operations the lower over-all cost.

When multiple supply circuits are installed for street lighting purposes only, the copper cost may be higher than with series. When multiple supply circuits are shared with other loads, the circuit cost assessed against street lighting is relatively small.

Series circuits comprise 85% of all street lighting systems in this country.

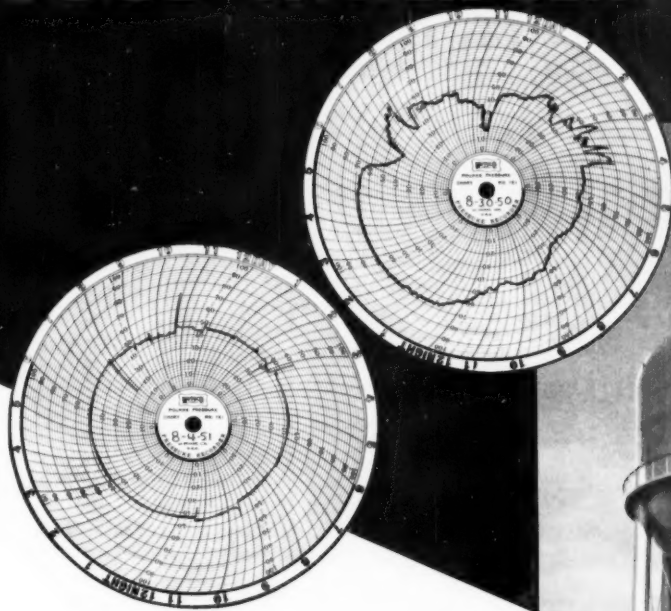
In the past six years, the average lamp sizes of incandescents have increased from 2500 CP. to 3100 CP. and the mercury lamp sizes from 17,000 lumens to 18,000 lumens.

No lamp size under 2500 lumens is recognized by IES. If an investment in luminaires, poles, cable or wire is made, a minimum of 2500 lumens in residential sections, and higher candlepowers for traffic and business streets, should be used.

All street lighting in the business area—"Fire Zone"—should be installed with cable in underground ducts for appearance and safety.

For economy, many municipalities and utilities are using overhead circuits for street lighting on arterial traffic ways and residential streets. One or two small wires mounted on slender steel poles, 25 to 35 ft. overhead, are scarcely noticeable and do not mar the appearance of the street as do a num-

GOOD WATER SERVICE NOW



... and in the FUTURE

Installation of a 500,000-gallon Horton elevated tank at Park Forest, Illinois, means not only better water pressure for the community now but satisfactory and dependable service in the years to come.

The pressure charts reproduced above tell the story of what the Horton elevated tank did for Park Forest. Notice how distribution pressures dropped off during periods of peak demand before the Horton elevated tank was installed . . . and how, after its installation, pressures remain relatively high throughout the day . . . even during periods of peak demand.

Properly located, Horton elevated tanks can reduce pressure variations throughout a whole city. This means more efficient operation of the pumping system and lower pumping costs.

An elevated water tank can do for most water systems what it did for Park Forest. There is no reason to put up with pressure variations in your city when elevated storage can eliminate them so easily.

Horton elevated water tanks with ellipsoidal bottoms (similar to the Park Forest tank) are built in standard capacities from 15,000 to 500,000 gallons. Larger tanks with radial-cone bottoms are built in standard capacities from 500,000 to 3,000,000 gallons. Write for information or quotations. There is no obligation on your part.



500,000-gallon Horton ellipsoidal-bottom elevated water tank built for the community of Park Forest, Ill. Consulting engineers were Consoer, Townsend & Assoc., Chicago, Ill.

HORTON

WELDED STEEL
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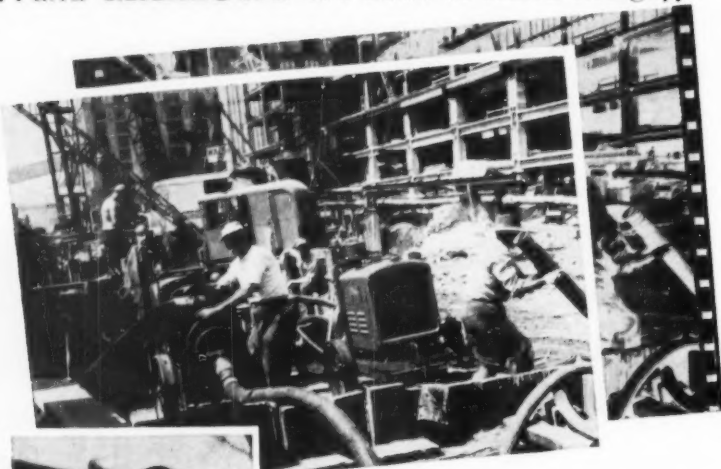
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Detroit 26 1536 Lafayette Bldg.
Houston 2 C & I Life Bldg.

Los Angeles 17 1508 General Petroleum Bldg.
New York 6 3316-165 Broadway Bldg.
Philadelphia 3 1646-1700 Walnut St. Bldg.
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Seattle 1 1339 Henry Bldg.
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...and **MARLOWS** are built to stand the gaff!



Here is what Harvey Reeves, of the Foundation Equipment Co., Long Island City, N. Y. has to say . . .

"We operate the largest pump rental fleets in New York and Chicago . . . and both fleets are 100% Marlows. Marlow pumps maintain new pump performance longer and can be put back into new pump condition at less cost. They are the best contractors pumps built today."

Yes . . . pump rental is the toughest kind of service. If MARLOWS are best for rental they *must* be good. Day in and day out, MARLOW Self-Priming Centrifugal Pumps are handling the toughest kind of rental jobs.

In some cases, MARLOW PUMPS — (the preferred pumps for rental fleets) — are sent as far as 500 miles from home warehouses. The pump distributor cannot take any chances of a breakdown that will seriously halt job progress — he has to have the best pump on the job. That's why so many distributors rely on MARLOWS for the rental fleet.

MARLOW Self-Priming Centrifugal Pumps are built to last longer — (cheaper to overhaul) easy to check and service in the field. Practical design assures long engine wear; after long, hard use MARLOWS can be restored to full original efficiency by simply replacing the impeller and diffuser.

Keep this in mind when you think of pumps...the largest Pump distributors rebuild all kinds of pumps but they limit the rental fleets to MARLOWS. Men who have to be right when it comes to picking the pump for the job *always* rely on MARLOWS.

• Write today for facts, figures and specifications.

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Branch Plant: De Queen, Arkansas.

Other factories in France and England. Distributors and Dealers' everywhere.

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PUBLIC WORKS for January, 1953

ber of distribution wires mounted on wood poles along the curbs in fine residential areas.

Recent Trends and Installations

Trends in the various types of street lighting installations are shown by the comparisons between 1946 and 1952, the 1946 figures being given first: Incandescent 97 per cent plus and 96 per cent plus; mercury, 0.5 per cent and 2.5 per cent; sodium, 0.5 per cent unchanged; gas and arc, 2 per cent and 0.5 per cent.

Trends in lighting standards and poles installed during the years beginning with 1947 and up to June, 1952, have been: Steel, 92 per cent; concrete, 6.7 per cent; and aluminum 1.3 per cent.

Some installations of modern luminaires and poles since the end of World War II, under IES Recommended Practices are: Chicago, 33.-453; New York, 6700; Washington, 1336; Philadelphia, 614; Oklahoma City, 1504; Houston, 1392; San Antonio, 794; Denver, 1965; Pittsburgh, 1754; Fort Worth, 325; Dallas, 357; Los Angeles, 4398; and Atlanta, 658. Atlanta is probably the first large city to light all principal traffic arteries. The remainder of its program is scheduled for completion during 1953.

• • •

Priorities & Allocations

GIL GUETZKOW,

Director of Priorities & Allocations,
City of Milwaukee, Wisconsin

WASHINGTON tells us that priorities and the allocation of materials are necessary to maintain a balanced economy between defense and civilian requirements. To us, who represent municipalities, they are a big headache!

Nevertheless, all of us are interested in getting our just share. For example, let's assume that your municipality has decided to construct a pumping station. The location has been purchased, the engineering and architectural drawings have been completed, and you have enough information to fill out Form CMP-4C. This is the application for authority to start construction and for allotments of controlled materials.

The answers to the questions on this form are the facts regarding the construction schedule, the estimated construction cost, and material and equipment requirements. The most important part of this ap-

plication, and sadly enough most often neglected, is the process known in Washington as "fully documenting" the request. This simply means that you accompany your application with a detailed story of the reasons for your request.

Let's proceed to "fully document" the pumping station application.

Step No. 1

You will provide a map showing the location of the new station, the area it will serve and the present stations in the community. The area to be served by the new station must be fully described: Is it industrial? What types of industries? Do they have defense orders? Is the area residential? What is the present population? The number of homes? What type of homes? Is it a rapidly growing area? How will the new station fit in with your civilian defense program? What is the fire history of the area? Is this new station being built because of lack of pressure in that area of the city? Or why?

Describe the equipment to be housed in the new station and tell how it will help better to protect the community. If you have not selected a general construction contractor, explain why. Is it because contractors refuse to give a firm bid until the allotments are available?

Use photographs whenever possible in presenting your story.

Step No. 2

The pumping station application is now ready to be sent to the proper claimant agency, the Construction Controls Division of the National Production Authority. Be sure to enclose the self-addressed acknowledgment receipt card. It will be returned with the project number assigned to your application. This number is important because from here on in, this number—and nothing else—identifies your project.

The N.P.A. will process the application in due time and, if approved, will allocate the controlled materials. If the project is denied, you can resubmit your application with additional information "pointing up" your case.

Let's take a different type of construction project: The installation of a new fire and police alarm system. This application would be documented much like your fire station. You would submit maps showing the area to be served. They would show the present and proposed locations of the alarm boxes

ACTION proves MARLOW PUMPS

are the **BEST**
... for dependable,
low-cost performance!

Again Marlow gets the job!*

*23 Marlow Plunger Sludge Pumps Installed at the Southeast Sewage Treatment Plant, San Francisco, Calif.
—for re-circulation, draw-off and transfer of sludge.

ONCE MORE—Marlow Pumps are relied on for dependable, low-cost performance. Already over 400 municipalities, across the country, have installed Marlows because they are efficient, reliable and durable. They are built for the hard jobs and give that extra "plus" when constant pump performance counts most.

At the Southeast Sewage Treatment Plant, Marlows do a complete job:

- re-circulating sludge in digesters and transfer of sludge between digesters
- draw-off of sludge from digesters at a steady rate
- transfer of processed sludge from one elutriation tank to another
- transfer from final elutriation tank to vacuum filters
- transfer of raw sludge from thickening tanks to holding tanks or digesters.
- re-circulation of raw sludge in holding tanks or between holding tanks and receiving and thickening tanks.

Marlow Plunger Sludge Pumps are the direct result of many years of "on-the-job" research and development. They have set the pace for design refinements to meet job specifications.

Available in simplex, duplex, triplex or quadruplex assembly. 360 to 30,000 GPH capacity.

Write for details today. 105

MARLOW PUMPS

RIDGEWOOD, NEW JERSEY

Branch Plant: De Queen, Arkansas

Other factories in France and England. Distributors and Dealers everywhere

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in this area. If the telephone company could not adequately service this area, this fact should be mentioned. If the police boxes could be used for making emergency calls by the public, this information should be given.

In a project of this kind, a city usually has some of the materials on hand. If you do, be sure to indicate on your application these figures: The amount of material you need, the amount you have on hand and the total amount the project requires.

This application comes within the jurisdiction of several claimant agencies. To avoid undue delay, it should be sent to the Civilian Requirements Division in the Office of Distribution, N.P.A.

More Problems

In addition to construction problems, there are the necessary purchases for maintenance, repair and operating functions for the municipality. These materials are in fair to good supply at present. The rating used here is known as DO-MRO, meaning defense order—maintenance, repair and operating. They are rated on a money value basis.

Many of the needed supplies are now available without ratings. However, on all purchases scheduled for later delivery, use your rating. It is only the rated orders that will keep their place in the "delivery line", should supplies become tight due to a change in the international picture.

Let's assume that your pumping station is now under construction. One of your suppliers informs you that he is unable to get delivery of several structural beams. Here's a bottleneck. What can you do now?

The N.P.A. has a special priorities assistance form (known as NPAF-138) on which requests for assistance can be made. Before special assistance will be granted, the applicant must "clearly demonstrate" that help is needed to protect the health, safety or welfare of a community, or to overcome an unreasonable, exceptional and proved hardship. In order to "clearly demonstrate" that help is needed, it will be necessary to explain the efforts your city has made to help itself. Have you checked all sources of supply? Can several available beams be welded together as a safe substitute?

Surprisingly enough, when this is done, your efforts, together with those of your supplier, often solve the problem. But if you and your

supplier cannot solve your problem, then your claimant agency, once it has been fully and clearly informed, can usually help and will make every effort to do so.

Don't Forget

From our experience in Milwaukee, there is one very important point that should be remembered. Regardless of what you are building, be sure your engineer and/or architect designs the facility using standard structural shapes in weights that are readily available, and not special shapes and sizes. Specially designed structural shapes are practically impossible to obtain. This warning cannot be over-emphasized because once your project is under construction, and thereafter is held up because of specially designed pieces, you are really in trouble with no alternative but to wait or redesign.

You must remember that the allotments you receive for controlled materials are really a "hunting license" and do not guarantee delivery. The much talked about relaxation of controls on construction has been postponed until May 1st. You will then be able to use self-authorization for recreational, highway and certain other types of construction. This will take care of most of your smaller construction projects.

These self-authorizations may be used prior to May 1st; provided, that the orders do not call for delivery until after May 1st, 1953 and are not in excess of the self-authorized amount. This is in accordance with Revised CMP Regulation No. 6, Directive 8.

As many of you are aware, municipalities do not have a central agency with which to do business, but instead, operate through many branches and agencies. For example, in dealing with the Federal Bureau of Public Roads you deal with your State Highway Commission, then the Regional Office and finally the Washington Office. In public health matters, it's the State Board of Health, the Regional Office and on to Washington.

There is, however, one division in Washington that is rapidly expanding its facilities to help municipalities. It was formerly known as the Government and Public Services Division under the Office of Civilian Requirements. This agency has been kicked around quite a bit recently. It has now been reorganized and is known as the Civilian Requirements Division under the Office of Distribution.

It is suggested that you send a copy of all construction applications or requests for help to this division with a letter asking their assistance. They will help by following up your request. Should it be necessary for you to contact Washington regarding your project, this division will direct you to the proper agency and individual.

I have many times been asked, "How do you keep up with all the directives?" It is a difficult task, but by process of elimination, I now use four sources of information. They are:

1. *Defense Production Record*—Weekly, 5¢ per copy from Superintendent of Documents, Government Printing Office, Washington 25, D. C.
2. *Business Service Check List*—Weekly, \$1.50 yearly from U. S. Department of Commerce, Special Business Service Desk, Room 6225, Washington 25, D. C.
3. *Bulletin of Commerce*—Weekly, free from field office of the U. S. Department of Commerce.
4. *Journal of Commerce*—Business newspaper.

From my experience, I can say that once you get the right person handling your project, you will find that he is usually a fine fellow who is willing to assist you. He cannot always give you what you want, but the more he understands your problem, the easier it will be for him to help you.

These data were presented by the author as a paper before the American Municipal Congress at its Los Angeles meeting.

• • •

Ozalid Printer Saves Time

The purchase and installation of an Ozalid printing machine in the office of the city engineer has greatly aided us in getting out reports promptly and has been an excellent time saver. This machine is being used to great advantage by the various bureaus of the city government. 1951 Report, City of Easton, Pa.

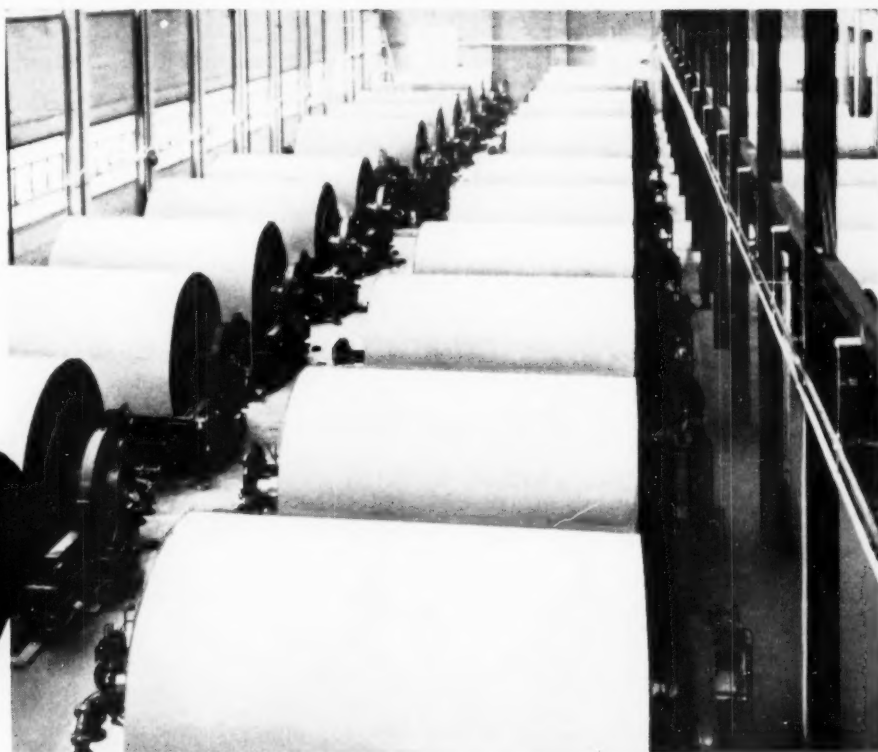
• • •

Solving Sub-division Problems

This Village is unique in that the developer of subdivisions is supplying all utilities, and these are dedicated to the Village (except for water, which he retains) on a subdivision basis in good condition. And pretty soon, the developer will have a full-time engineer.—John G. Duba, Consulting Engineer, Park Forest, Ill.

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66 Conkey Sludge Filters now installed in one plant of Chicago Sanitary District

The West-Southwest Treatment Works of the Chicago Sanitary District is the largest sewage treatment plant in the world. Here, the huge volume of industrial and residential waste from the heavily populated metropolitan area has presented sewage engineers with an unparalleled challenge. Progressively, the Chicago Sanitary District has met that challenge. Starting twenty years ago with installations of continuous vacuum filters for activated sludge, Sanitary District engineers have developed the most exacting specifications and rigid requirements for filter designs and performance . . . culminating in the installation of 66 Conkey Rotary Drum Vacuum Filters for this largest single installation in the sewage field.

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Flotating cake discharge scraper.

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Portland Water

(Continued from page 61)

ideal is very nearly realized. Only 7.6% of the entire consumption must be boosted with pumps, but that is a tough fraction.

The possibility that people would ever choose to live on the precipitous heights above the lower benches would have startled the designers of the system. It was sup-

posed that no booster pumping would ever be necessary. In these latter years it has become a fad to live on the highest crests and pinnacles of the surrounding hills.

On the street going up to Council Crest the grade is 19%, and some streets are steeper than that. The elevation of Harbor Drive is 29.5 feet, while Council Crest, the highest point in the city, not more than a mile in a straight line from the Willamette River, is 1073 feet.

The overflow of the standpipe on Council Crest is at 1,144 feet. Mt. Tabor, where four of the reservoirs are located, is 645 feet, and Rocky Butte is 607 feet.

The reason for building in such places is to get the view. In Portland "the view" is always Mt. Hood, raising its snowy head over 11,000 feet above sea level about fifty miles to the east. When it isn't raining all visitors to Portland have to go up to Council Crest to see Mt. Hood. Up there you have a feeling that if your foot should slip you'd land smack in the river. But today Council Crest is ringed about with expensive homes; and some of them are actually anchored in place with cables fastened to masses of concrete.

Even for the gravity supply it was necessary to build reservoirs within the city. Now there are four on Mt. Tabor, on the east side of the river, and two in Washington Park, on the west side. These have a combined storage capacity of 192 million gallons. In addition there are 23 tanks and standpipes varying from 60,000 to 1,000,000 gallons capacity, located about the city on elevations from 200 to 1096.5 feet.

Pumps and Pressures

Although only 7.6% of the consumer supply has to be boosted, the array of pumps is impressive. Two plunger type pumps are in use, both Fraser-Chalmers (Riedler), one rated at 1 mgd and the other at 0.5 mgd. The first of these is being replaced with a Fairbanks-Morse unit rated at 1.3 mgd. There are fourteen centrifugal pumps in daily use, with a total capacity of about 15 mgd. Of these, two are Gould; four are Fairbanks-Morse; one is Allis-Chalmers; three are De Laval; three are Bingham; and one is a small Alberger. The De Laval is to be replaced with a new unit of the same make; and an additional 1 mgd unit will be added.

From the beginning, the system has been divided into high pressure areas and low pressure areas. The topography of the city explains this. The reservoirs on Mt. Tabor receive water directly from the headworks, through the three conduits. Besides supplying the east side of the city they fill the reservoirs on the west side of the river through four conduits. Two of these, 24 and 30 ins. in diameter, are laid in trenches under the river. The other two, both 24-in. are carried across the river on Ross Island Bridge.

George E. Martin

JOINS PUBLIC WORKS AS HIGHWAY EDITORIAL CONSULTANT



THE Editors of PUBLIC WORKS are happy to announce the addition of George E. Martin as highway consultant to the editorial department.

Until January 1, 1953, Mr. Martin was consulting engineer for the Paving Materials Department of Barrett Division, Allied Chemical and Dye Corporation, New York.

His new duties at PUBLIC WORKS will touch every phase of advising on the procurement and editing of the most practical articles on all highway subjects. They will include technical guidance and advice in matters pertaining to highway engineering problems and policies; and in abstracting, digesting, and interpreting of reports by committees, research groups, etc., in order that our readers may get the essentials of these completely and easily.

He will also prepare for us special staff articles that will be more com-

plete and useful than engineering magazines have hitherto published.

The net result of his activities with us will be a still stronger impact by PUBLIC WORKS on the whole highway field.

For a still-young man, George E. Martin has had a remarkably long and varied career. Starting slightly ahead of the good roads movement, he has kept ahead of it ever since. After graduation from Purdue University he spent a year at the University of Illinois, then taught at Colorado College, keeping, as he phrases it, "barely one page ahead of the class." But, as always, ahead.

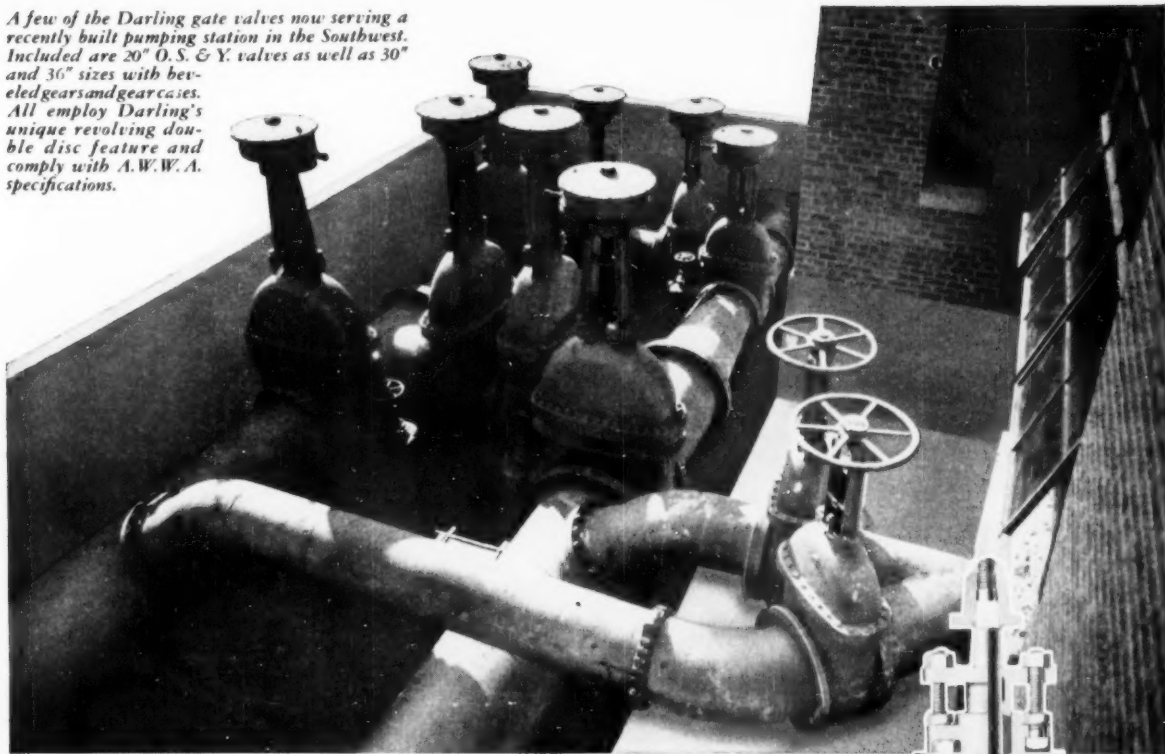
When Purdue established a Department of Highway Engineering, Mr. Martin headed it. He also was a major factor in founding and conducting the Purdue Road School and engineering extension work in the state of Indiana.

During World War I, it was Captain Martin of the 23rd Engineers. At its end he shortly joined what was then the Barrett Company, of Chicago. Since, he has been closely identified with the development and manufacture and use of road tars and asphalts in the United States and Canada.

He concludes his own resumé of his career with a modest "It has been a lot of fun assisting in the development of our highway system; and now, among other things, I hope to collect and record information for the benefit of the engineers doing the actual work."

PUBLIC WORKS takes pride in providing a framework and a forum for this important new project by one of America's foremost highway authorities.

A few of the Darling gate valves now serving a recently built pumping station in the Southwest. Included are 20" O. S. & Y. valves as well as 30" and 36" sizes with beveled gears and gear cases. All employ Darling's unique revolving double disc feature and comply with A.W.W.A. specifications.



Planned Economy... with Darling fully revolving double disc gate valves

IN water and sewage plants, there's a sure-fire way to plan for years and years of lowest-cost gate valve performance. That's the experience in plant after plant where Darling fully revolving double disc, parallel seat gate valves are on the job.

These valves come closer to being trouble-proof than any you've ever run across. In the event of valve body distortion, the unique wedging feature automatically adjusts discs to seats for drop-tight closure. And to cinch prolonged, low-maintenance service, wear is uniformly distributed

because the fully revolving discs take a *different seating position* at every closure!

It adds up to smooth, reliable operation, and greater service life with minimum attention. But why not get *all* the facts on how Darling valve features can work to your advantage?

SEND FOR BULLETIN No. 5002

Darling's latest bulletin is full of helpful information and describes Darling valves for every normal or unusual service...yours for the asking.

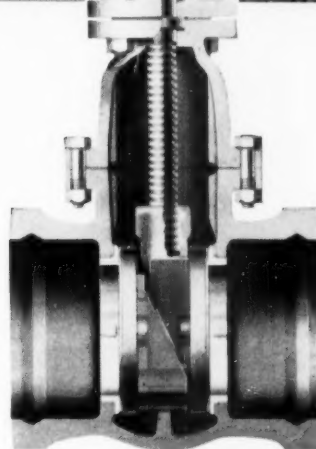
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DARLING VALVES FOR PLUS VALUES, JOB-PROVED AGAIN AND AGAIN

Now's the time to mail this month's Readers' Service card.



Note rugged simplicity of this unique Darling principle—just four sturdy working parts . . . two plain interchangeable no-pocket discs and two husky wedges. Assembly and maintenance is extremely easy and fool-proof.



On the east side there are now four pressure areas, High, Vernon, Intermediate, and Low, supplied from elevations 411,362,305 and 229. On the west side there are only the two original designations, High and Low. The gravity flow must be controlled still further for changes in pressure with 38 regulating valves ranging from 2 to 24-in.

Pressures are held to 40-70 pounds in residential areas, and 60-80 pounds in the business section. Nearly 7,000 fire hydrants are distributed in the city. Fourteen large meters from 6 to 36 ins. in size

record the daily flow to all points in the city. Automatic recording gauges give a continuing record of flow conditions.

An enterprising use is made of the drop in head from the higher reservoirs. Two of the pumps on the west side are driven by Pelton water wheels installed in the gravity flow line coming down from the highest reservoir. One of the pumps on Mt. Tabor is driven by a Leffel turbine installed in a down-flow conduit.

Assuming that no contamination enters, the water on Bull Run

watershed should be almost perfect for human use. Bull Run Lake is fed by springs. The deep canyons of West Fork and Sandy rivers cut the watershed off from the discolored drainage from Mt. Hood.

About 80% of the whole reserve is covered with virgin timber, though about 15% of this has been partially burned over and is now coming back in second-growth stock. It is estimated that the reserve carries 4 billion board feet of timber. This cover goes far toward slowing run-off and insuring the trickling of rain and snow precipitation into the vast underground reservoirs of broken rock.

The average flow at the headworks is 812 cfs, with a high of 21,000 and a low of 64 during the late summer. There is every reason to believe that this flow will be maintained. Additional storage reservoirs can be built on the watershed to supply four times as many people as at present.

The water is very soft, with a pH value of 7. It is of excellent quality for both domestic and industrial use. It is given a light treatment of chlorine 3 to 4 pounds per million gallons, with about 1/5 that much ammonia to retard the action of the chlorine and to offset any tendency to develop taste or smell due to the decay of algae and falling leaves.

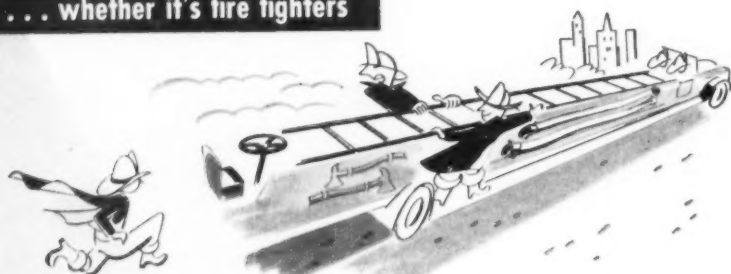
Water is used very freely throughout the city. Among the distinctive institutions on the streets are flowing drinking fountains. Down town these have four drinking nozzles; farther out only two; and some have only one. They all flow constantly, and are used by all classes of people. Business places, churches, and even small shops install flowing drinking fountains at their locations. Restrictions on the use of water, even in the dry months, impose little hardship.

The financial report of the Bureau of Water Works for the year ending June 30, 1950, shows that the revenue was \$2,666,720, an increase of \$159,000, or about 7%. Operating expense was \$1,522,593, an increase of \$83,590, or 6%. The net bonded indebtedness is \$4,458,853, a reduction of \$825,988. The total daily average consumption was 52,963,000, an increase of 2,841,000 gallons per day.

The tradition of efficient administration is carried on today by Fred L. Peterson, Commissioner of Public Utilities, ably assisted by Ben S. Morrow, Engineer and General Manager, and by George A. Marshall, Superintendent.

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**PUBLIC
WORKS**
DIGESTS

THIS section digests and briefs the important articles appearing in the periodicals that reached this office prior to the 15th of the previous month. Appended are Bibliographies of all principal articles in these publications.

WATER WORKS	81
HIGHWAYS AND AIRPORTS	92
SEWERAGE AND REFUSE	98

THE WATER WORKS DIGEST
**Jacking Large
Pipe Under Railroad**

In laying a 56" concrete-lined main between Cambridge and Boston, Mass., it was necessary to cross a river 600 ft. wide, a highway 90 ft. wide, and pass 150 ft. under 14 railroad tracks. The section under the tracks was laid inside a 7-ft. casing of steel $\frac{5}{8}$ in. thick, which was jacked under the tracks, using two 300-ton hydraulic jacks. To back up the jacks, they were tied back to timber blocks and vertical H piles backed by batter piles. The pipe was handled in 10-ft. sections, which were welded together successively as the pipe moved forward. Dirt was excavated from the heading by hand and removed in buggies. When 75 ft. had been pushed, side pressure deformed the pipe into an elliptical shape, and it was jacked into round and held by longitudinal box beams and steel-pipe spreaders. When 120 ft. of pipe had been jacked in, the friction was so great that the 600-ton push would move it no further, and the last 30 ft. was laid by cut and cover, two railroad tracks being taken out. The tracks were removed, the trench excavated, pipe laid, back-filled and tracks replaced, all between 6 P.M. Friday and 8 A.M. Saturday.

"Water Main Tests Contractor's Ingenuity;" *Engineering News-Record*, Nov. 13.

**Incidental Benefits
Of Lime-Soda Softening**

During ten years of softening Mississippi river water by the lime-soda process using a Spaulding "Precipitator," Minneapolis, Minn. has found that water with hardness

ranging from 224 ppm to 92 ppm was softened to within 10 ppm of the desired 75 ppm. Carbonation was accomplished by use of commercial carbon dioxide gas forced through the wall of canvas hose by a pressure of 20 psi. The color of the raw water has ranged from 190 ppm to 13 ppm, which has been removed satisfactorily by the softening process without any further treatment. The process also effected a great reduction in the coliform organisms. During September and October 1950, the raw water coliform index averaged over 10,000 per ml., while that of the softened water averaged 240 and 360. The 37° bacterial counts were reduced from an average of 2,000 to an average of 32. This reduction is due to physical removal by the precipitate and also to the causticity.

A. C. Janzig—"Incidental Benefits Achieved by Lime-Soda Softening Process;" *Water Works Engineering*, November.

**Ultra-Violet Light
For Water Disinfection**

New York State health authorities recently tested a process for sterilizing water by cold ultra-violet light. Using a 6-lamp machine with a capacity of 750 gph to treat water low in turbidity and with a color of less than 5 ppm, into which coliform bacteria had been introduced, there was complete destruction of the bacteria with 2.8 seconds of exposure. The water was then colored, and it was found that with 4.2 seconds exposure full disinfection was obtained if the color was less than 75 ppm. It was concluded that the process may have value in treating swimming pools and small water supplies. The tubes

must be kept clean of deposits. The cost of current was very small.

"Tests of Cold Ultra-Violet Light for Water Disinfection;" *Water Works Engineering*, November.

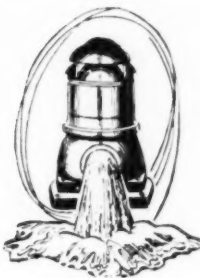
**Allowances
For Water Hammer**

There being divergent opinions on the merits of setting up standard allowances for water hammer as a part of the standard specifications for the various types of pipe used in water supply installations, a panel discussion was held by members of the AWWA, including consultants, manufacturers, and users. Included was the question whether changes should be made in the current standard allowances for cast-iron pipe, which were based on work done in the 1890's; since which time pipe velocities have increased, centrifugal pumps have come into general use, automatic valves are much more common, and new methods of making pipes and pipe joints have been introduced. The general opinion seemed to be that the current allowances for cast-iron pipe are satisfactory in the majority of cases; but if there is any question in a given case, an adequate theory of water hammer is available for making a special study. Also, use should be made of modern control devices, and customers should be prevented from employing practices which would produce excessive water hammer.

For steel pipes, the plate thicknesses generally adopted to meet external loads are greater than those required for static internal pressure alone. Also, steel pipe possesses high strength and ductility; and no standard allowance for water hammer is needed. For asbestos cement

WATER

for Atlantic
City's
RITZ-CARLTON



DATA:

—WELL; Drilled by rotary clay-seal process, 850 feet deep in the Kirkwood stratum; double cased and graveled.

—CASING: 145 feet of 16" and 747 feet of 12" steel.

—SCREEN; 61 feet of 6-gauge Armco Iron.

—PUMPS; Originally equipped with 4-stage 15" bowls with cast iron impellers. Later replaced with 5-stage 12" bowl and bronze impeller.

—MOTOR; Original 25 HP electric still giving good service.



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In the twenty-eight years of almost constant operation, the Layne unit has produced more than 1,471,680,000 gallons of water—all the fresh water needed by this great hotel. Upkeep expense since the day installed has averaged less than a hundred and seventy dollars a year. One amazing fact is that the original Armco iron screen is still functioning. Another is that the well was installed by a method that completely sealed off all infiltration of salt water in a most difficult salt water area. Such is the life expectancy, satisfactory operation and generally low upkeep expense of Layne wells and pumps.

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pressure pipe, it was said that Transite pipe is made to withstand 4 times the working pressure, which should be sufficient to allow for water hammer. In the case of reinforced concrete pipe, the pressures are carried by a steel cylinder, or by steel reinforcing, or by both; and the customary design stresses, allowing for an increase by water hammer of 40 to 50% over operating pressures, have been shown to be adequate by 30 years' experience.

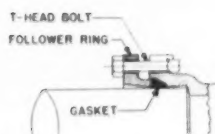
"Standard Allowances for Water Hammer," *Journal American Water Works Ass'n*, November.

Rain Making and Water Resources

During the last six years significant progress has been achieved in rain increasing. Present operations aimed at increasing natural precipitation utilize the concept that rainfall may be induced over wide areas only during natural storm conditions. The substances used principally as ice crystal producers in supercooled cloud masses are dry ice and silver iodide. Dry ice operates by cooling the air to temperatures below -40° F. Silver

iodide can be vaporized to produce a myriad of tiny sublimation nuclei which will act to produce ice crystals in saturated air at approximately 27° . The former must be introduced from the tops of the clouds by aircraft. Silver iodide can be introduced into cloud masses from the earth's surface. "In all probability, weather modifications will become a pushbutton affair within the next decade."

Irving P. Krick—"Increasing Water Resources Through Weather Modification," *Journal, American Water Works Ass'n*, November.



Made-up Mechanical Joint cut away to show its design.

Standard compression type fire hydrant made in full compliance with latest AWWA Specifications. Available in Standard model or Traffic model. Main valve opens against the pressure. Valve will remain closed in case hydrant is broken off in traffic accident. Features include low friction loss, high efficiency, revolving head, dry top, easy lubrication.

Hydrant shoe has two heavy lugs for use in strapping hydrant to pipe line. The end connection is Standardized Mechanical Joint in accordance with specifications of Cast Iron Pipe Research Association. A thick gasket is compressed by a bolted follower ring. Advantages include easy assembly, low joint cost; deflection, expansion and contraction without leakage. For complete information, write or wire M & H VALVE AND FITTINGS COMPANY, Anniston, Alabama.



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FIRE PROTECTION

Installing Service Lines

Data collected from 210 water works utilities in the United States (30 of them privately owned), have been tabulated by a committee of AWWA, with the following showings. Services are installed by 66% of the utilities themselves, charged to the property by 19%; maintained from main to curb or property line by 83% of those reporting, while in 17% the customer maintained them. Secondary or submeters are owned by the utility in 87 cities, by the customer in 111. Materials used in service lines include copper, lead, galvanized iron, wrought iron, brass and steel. None mentioned the use of plastics or aluminum. Copper alone was used by 51% of the utilities; as one of two or more materials by 38%. Lead alone was used by 3%; as one of several materials by 22%. Brass was used alone by 1%; galvanized iron by 5%; wrought iron by 2%.

"A Survey of Service Line Installation Practices," *Journal, American Water Works Ass'n*, November.

Molecular Filter Membranes

Filter techniques for the bacteriological analysis of water and fluids have been used in Europe for a number of years, and recently have come into limited use in this country. The filter membranes used in the United States are disks 48 mm in diameter. Hydrosol membranes used to date in most investigations in the United States are of domestic manufacture, but European membranes also can be purchased here. The authors used both kinds in a comparison study. Both are injured by pressure sterilization at elevated temperatures. The domestic membranes will filter approximately 700 ml. of distilled water at room temperature with a dif-

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pipe line's coefficient of flow *stays* high, you don't have to replace pumps with bigger ones that cost more to buy and operate.

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ferential pressure of 700 mm of mercury. The European membrane was sensitive to differential pressures in excess of 360 mm but had slower filtration rates, and had no grid lines as a counting guide. The bacteriological data obtained by the two types were in reasonably good agreement, but ease and convenience in the technical procedure and rapid filtration rates were important factors in favor of the domestic membranes.

Harold F. Clark, Harold L. Jeter, Edwin E. Geldreich and Paul W. Kabler—"Domestic and European

Molecular Filter Membranes;" *Journal, American Water Works Ass'n*, November.

Plastic Pipe For Services

The use of plastic pipe for water services was discussed by two speakers before the Water Distribution Division of the California Section of the A.W.W.A., Max K. Socha, engineer of water distribution of Los Angeles, and J. N. Spaulding, supt. of water of Pacific Gas & Electric Co. Their investigations

had indicated that the tests must continue to obtain a plastic pipe which will fulfill all the requirements of the water works men but that even now, they have in use a considerable amount of plastic pipe. Many types have been eliminated due to brittleness, cost, bursting pressure, leakage at fittings and difficulty of making connections. However, it has been found that plastic pipe services are cheaper to install and cost about half as much as copper for the material. Plastic pipe is not a grounding material so it has been necessary to notify consumers that they may make other metallic grounding arrangements.

"Record California AWWA Conference;" *Western City*, November.

Salt from Wells For Zeolite Regeneration

New Smyrna Beach, Fla., obtains its water supply from wells 200 ft. deep located 4 miles inland from a brackish river and 6 miles from the ocean. The water is aerated to remove the hydrogen sulfide, settled in an 87,000-gal. reservoir, and pumped through three zeolite softening units with a total capacity of 2 mgd. The zeolite used is Permutit Q. Brine for regeneration is obtained from a well 1200 ft. deep located at the plant site. This brine is aerated and stored in a 103,000-gal. reservoir, from which it is transferred automatically to the softeners as needed. A somewhat similar installation at Jacksonville Beach, Fla. uses salt water from the ocean for this purpose.

C. E. Wright—"Salt Well Furnishes Brine for Softening;" *PUBLIC WORKS*, December.

Plastic Tubing for Service Installations

The American Water Works Co., which owns 111 water companies in 22 states, in 1951-52 used plastic tubing for installing more than 850 3/4" and 1" services. This material was used because of difficulty in obtaining enough copper tubing, and because copper tubing is more expensive and likely to increase in cost and may become difficult to obtain, while there are abundant supplies of the ingredients of plastic pipes; and because the company is always looking for better materials and methods. The type of plastic used was polyethylene. It is flexible, light in weight and claimed to be immune from deterioration in the ground. It will not withstand high temperature, and its use was confined to lo-

Clogged underground mains are terrifically expensive to own or operate! Every particle of scale and rust deposit cuts capacity, sky-rockets your pumping and operating costs.

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ground costs at least \$6.00 a foot wrapped and laid. Tees and crosses are extra. Flexible can *clean* that SAME LINE FOR ABOUT 18¢ PER FOOT—or 1/30th the cost of replacement!

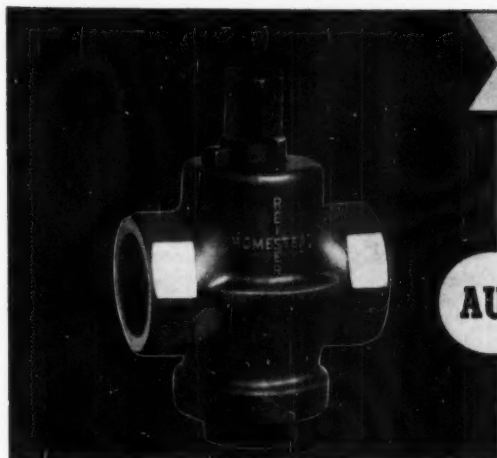
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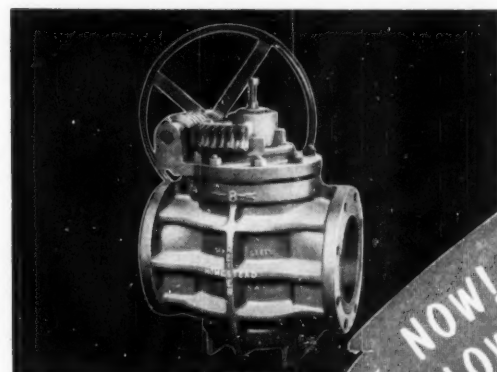


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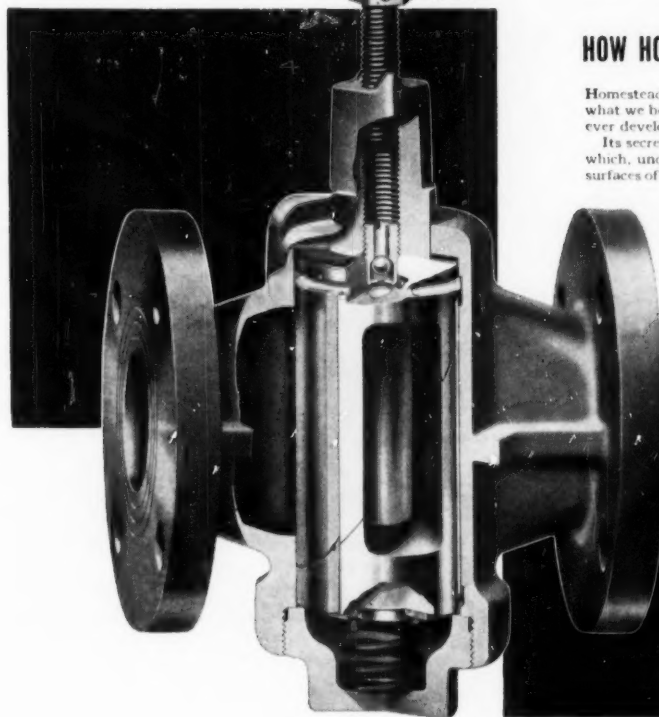
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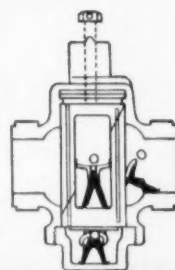
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cations where pressures were below 100 psi. The first tubing used was too light and some of the adapter nipples used broke with earth settlement. The tubing finally adopted has walls 0.173" thick for the 3/4" and 0.181" thick for the 1"; and bronze adapter nipples were used. It is believed that this tubing is not toxic.

J. G. Carns, Jr. and M. E. Flentje—"Experience with Plastic Tubing for Water Service Installations;" *Water & Sewage Works*, November.

Fluoridation at Washington, D. C.

Washington is believed to be the largest city that has as yet adopted fluoridation of its water supply. Very complete plans were prepared for the installation and are described in the article, together with the preliminary operating experiences, which began in June, 1952. The average water demand is 176 mgd. Sodium silicofluoride is used, delivered in 350 lb. drums. It is removed from the drums to storage tanks by means of a Dracco pneumatic system, the nozzle of the pneumatic hose being inserted in the drum. This avoids all dust in

handling and has proved highly satisfactory. The main difficulty experienced is the tendency of the silicofluoride to form lumps in the bins and hoppers, although it is not hygroscopic. So far, none of the remedies for lumping that have been tried has proved successful. It is believed that bins or hoppers should have one vertical side, and the other sides slope at least 60° from the horizontal. There has been some corrosion of metal parts in the feeder mechanism. Hard rubber pipe and plastic pipe of a polyethylene base have some advantages over rubber-lined steel pipe for handling the solution. When alum and fluoride were fed together, there appeared to be a definite absorption of the fluoride by the alum of from 5% to 30%, depending on the alum dosage; causing a deficiency of fluoride residual. The water, after receiving the fluoride, travels through two large open reservoirs, a cross-town tunnel and slow sand filters, but there is little if any loss of fluoride during this passage.

Norman E. Jackson and Edwin A. Schmitt—"The Washington Story of Fluoridation;" *Water & Sewage Works*, November.

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Increasing Water Resources Through Weather Modification. By Irving P. Krick, Pres. Water Resources Development Corp. November, Pp. 996-1020.

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Plainfield, N. J. Meter Repair Shop. By George M. Haskew, Engr. & Supt. November, Pp. 1027-1029.

The Ridgewood, N. J. Service Building. By J. Arthur Carr, Eng. & Supt., Dept. of Water Supply. November, Pp. 1030-1032.

Industrial Water Use. By W. J. Lauterbach, Chemist, Corn Products Refining Co.; M. D. Sanders, Chem. Engr., and L. W. Petersen, Chem. Engr., Swift & Co.; and C. J. McLean, Hydraulic Engr., Pub. Service Co. of No. Illinois. November, Pp. 1033-1042.

Long Range Water Supply Planning for Wichita, Kan. By Robert H. Hess, Supt. Mun. Water Supply. November, Pp. 1043-1051.

Domestic and European Molecular Filter Membranes. By Harold F. Clark, Harold L. Jeter, Edwin E. Goldreich and Paul W. Kahler, Bacteriologists, Environmental Health Center, U. S. P. H. S. November, Pp. 1052-1056.



Irrigation for Cannery Waste Disposal

FOR disposal of considerable amounts of waste water, as well as for irrigating food crops, the Hipke Foods, Inc., cannery at Mt. Calvary, Wis., has installed an irrigation system using plastic pipe. This pipe is not only resistant to corrosion, but it is not affected

by the high acid content of the waste. The disposal system consists of two 50-ft. mains of 3-inch Carlton pipe and two 100-ft. laterals. Six sprinklers are equally spaced in the two laterals. These handle about 12 gpm each, or a total of about 4300 gallons per hour. The waste is

pumped to the sprinkler heads by centrifugal pumps.

A particular advantage of the lightweight pipe was its flexibility, which permitted it to be laid directly on top of the ground. As the ground in an area becomes too saturated to take up the waste, the entire unit can be moved readily to another location. Stakes are driven into the ground to keep the sprinkler supports from turning over. The original installation was made by two men in two hours.

Detergents for Street Cleaning

Birmingham, England, has been trying out the case for detergents in cleaning streets adjoining markets, bus terminals and taxi stands. A gallon of detergent is added to the 1050-gal. tank of a sprinkling wagon. Each night the roadway is thoroughly sprayed twice with this mixture, which leaves it with a covering of detergent foam. The grime is thus loosened and is readily removed with a brush machine. A final sprinkling with plain water leaves the surface thoroughly clean. It is found that less water is used than with ordinary sprinkling.

Silica Removal Characteristics of Highly Basic Anion Exchangers. By M. E. Gilwood, Calvin Calmon and A. H. Greer, Permutit Co. November, Pp. 1057-1064.

Standard Specifications for Short-Body Cast-Iron Fittings, 3-Inch to 12-Inch, for 250 PSI Water Pressure plus Water Hammer. November, Pp. 1065-1074.

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Engineering News-Record

Water Main Tests Contractor's Ingenuity. Nov. 15, Pp. 44-46.

Public Works

Salt Well Furnishes Brine for Softening. By C. E. Wright. December, Pp. 63-64.

New Water Plant Rehabilitates Town. By J. L. Morrison. December, Pp. 71-72.

Fluoridation Experiences in Washington. December, P. 104.

Water & Sewage Works

The Washington Story of Fluoridation. By Norman E. Jackson, Chf. Paleocarta Section and Edwin J. Schmitt, Chf. Water Supply Div. November, Pp. 435-444.

Experience With Plastic Tubing for Water Service Installations. By J. G. Larns, Jr. and M. E. Flentje, Engrs., American Water Works Service Co. November, Pp. 446-447.

How Modern Chlorination Started. By Harry A. Faber, Assoc. Editor. November, Pp. 455-459.

Water Works Engineering

Adelaide Water Supply System. By H. Bowden Fletcher. November, Pp. 1042-1044.

Incidental Benefits Achieved by Lime-Soda Softening Process. By A. C. Janzig, Supt. of Water Treat., Minneapolis, Minn. November, Pp. 1045-1046, 1076.

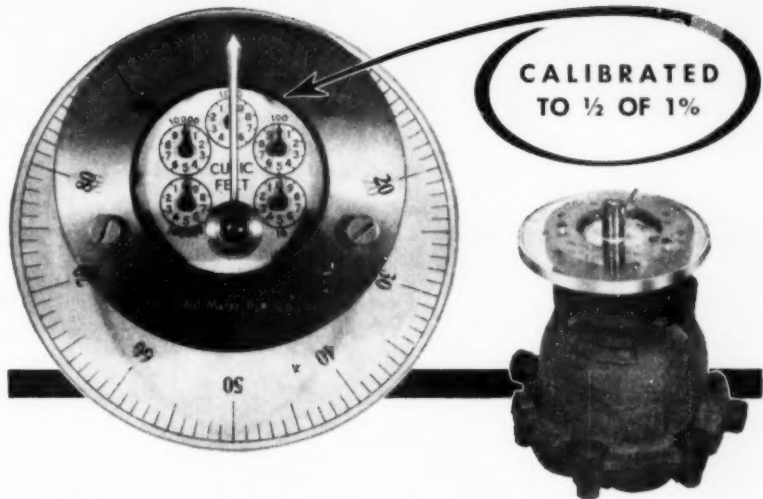
Pipe Cutters for Cast Iron Pipe. November, Pp. 1051-1052.

Special Crane for Los Angeles Power System

The world's largest crane on rubber tires, a 45-ton Lorain Moto-Crane, is used by the Los Angeles, Calif., municipal power department



for heavy-duty construction and erection jobs. It is utilized largely to service and replace heavy transformers at the 6 receiving and 109 distributing stations of the system, which operates more than 9,000 miles of sub-transmission and distribution lines.



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PUBLIC
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DIGESTS

THE HIGHWAY AND AIRPORT DIGEST

Indiana

Experimental Highway

An experimental highway more than 10 miles long is under construction in Indiana, being part of Dixie Highway. It is being built by the highway commission under direction by the state legislature to "conduct adequate and conclusive tests of both materials (concrete and bituminous flexible) under exact circumstances." The project will consist of a 2-lane highway built parallel to the existing 2-lane, separated from it by a depressed median 24 ft. wide. The Portland Cement Ass'n and the Asphalt Institute were asked to recommend designs. The concrete design calls for a 9 in. uniform thickness reinforced slab on a 5 or 6-in. subgrade blanket two feet wider than the slab. The subgrade to be compacted to 95% of maximum density. Welded wire fabric reinforcement. No expansion joints. Dummy groove contraction joints at 40 ft. intervals. Air entraining concrete will be placed the full 24 ft. width in one pass. This was contracted for at \$5.01 per sq. yd.

The asphalt design consists of a high-density soil subgrade; 5 to 8 in. of permeable drain subbase; 8 in. of water-bound crushed stone macadam; 2½ in. of hot mixed asphaltic concrete base; 1½ in. asphaltic concrete binder course; and 1-in. asphaltic concrete surface course. The 24-ft. pavement will drain transversely to the roadside. The subbase is continued through the shoulder; and the top 6 in. of it is to be compacted to 100% of maximum density, with rolling at a moisture content not exceeding optimum. The subgrade and all pavement layers will be rolled with a heavy rubber-tired roller. The upper 1 in. of the subbase is to be treated with at least 20 lb. per sq. yd. of screenings. The subgrade

will be rolled to the maximum density which the soil will stand. This pavement was contracted for at \$5.50 per sq. yd.

"Indiana to Compare Pavement Types;" *Roads and Streets*, November.

Fillers for
Asphaltic Concrete

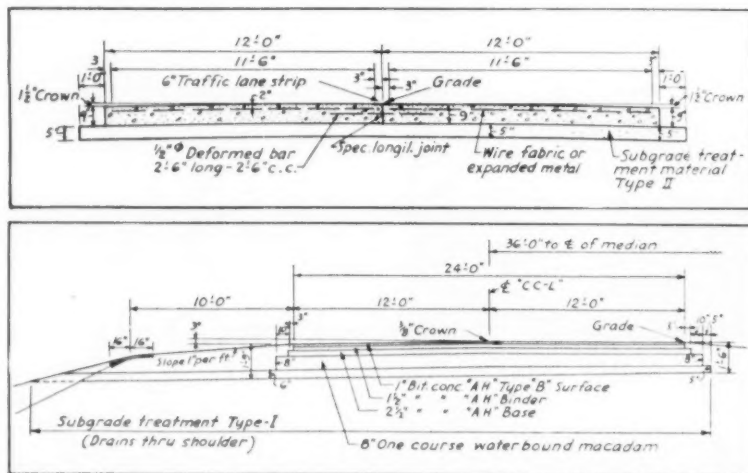
The judicious use of local aggregates and of mineral byproducts in highway construction can effect considerable savings in costs, through lower purchase prices and lesser transportation charges. Large waste piles of traprock fines, accumulated at quarries, and fly ash, a residue from combustion of powdered coal, offer cheap sources of fines for use in bituminous surfacing if they are found to be satisfactory for the purpose. To determine their value, a cooperative research has been conducted by the laboratories of the Massachusetts Dept. of Public Works; the New Jersey State Highway Dept.; the

Ohio State Dept. of Highways; the National Crushed Stone Ass'n; and the Bureau of Public Roads.

In this type of pavement, a satisfactory filler aids in resisting the softening action of water on the asphalt-aggregate mixture. It was found, in these tests that, for the materials tested, traprock dust and limestone dust would give satisfactory, and fly ash superior, resistance to water in bituminous concrete paving mixtures of the dense type. Rhyolite was found to be unsatisfactory. It was noticed that fly ash contained only 41 to 48% silica; trap rock 50 to 52%; and rhyolite 64%; the satisfactoriness varying inversely with the silica content.

From this study it was found that the 4-day, 120° F. immersion of the standard immersion-compression test generally can be relied upon to differentiate between satisfactory and unsatisfactory fillers. For border-line cases, a 7- or 14-day immersion may be necessary to clear up any doubt.

Where determination of compres-



Courtesy Roads & Streets.

● SECTIONS for Indiana test road. Portland cement concrete above and asphaltic concrete design below.



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sive strength or stability is important, the study showed that test specimens must be molded from freshly prepared mixtures, without any reheating or reprocessing. This restriction is apparently unnecessary when the only information desired is the effect of water on the compressed mixture.

Carl A. Carpenter—"A Cooperative Study of Fillers in Asphaltic Concrete;" *Public Roads*, December.

Microscopic Investigation of Soil Clays

The kind and amount of clay in a soil strongly affect its suitability as an engineering material and thus have a direct bearing on the design, construction and maintenance of highways. Knowledge of the amount of clay in a soil is not sufficient, for two soils having the same clay content frequently possess wide variations in properties, for the clay fractions themselves are inherently different. In studying clays, use has been made of X-rays, differential thermal analysis, specific surface area measurements, and chemical analysis. The Physical Research Branch of the B.P.R. has used the electron microscope to examine 95 soil clays, clay minerals and asso-

ciated materials, representing almost all of the individual members of the clay-mineral groups. A magnification of about 6,000 diameters was used for obtaining micrographs and these were optically enlarged to 21,000 diameters. In summing up a description of this study, the authors say: "In its own right, the electron microscope provides valuable information about soil clays which can be obtained in no other way. Admittedly, this essential concept has been well recognized by those closely allied to this research tool. It was felt, however, that the methods of electron microscopy should be specifically directed to the problems associated with soils as engineering materials. And it is from this point of view that this preliminary report has been made."

Earl B. Kinter, Adolph M. Wintermyer and Max Swerdlow—"Electron Microscopy of Soil Clays and Related Materials;" *Public Roads*, December.

Rubber-Asphalt Pavements in Milwaukee

About 18 months ago the Public Works Dept. of Milwaukee, Wis. laid test sections of rubber-asphalt

on one of its main traveled streets and as 10 x 20 ft. patches on a heavily traveled viaduct. Ground natural rubber was used on one section, processed rubber on a second and synthetic rubber on a third; using, for each two tons of asphalt mix, 18 lb. of natural rubber, 26 lb. of processed rubber, and 18 lb. of synthetic rubber. The material was prepared in the municipal asphalt plant. After 18 months of use the Department engineers state that the surfaces are satisfactory, but extended testing will be carried on and the financial aspect considered before adoption for large-scale use.

John Hubel—"Rubber-Asphalt Pavement Test in Milwaukee;" *PUBLIC WORKS*, December.

Plant-Mix Or Road-Mix

Plant-mixed bituminous surfaces cost more than road-mixed. Will the increased cost be offset by the advantages claimed—better control of the proportions of the mix, smoother surface, better control of thickness, and less inconvenience to traffic during construction? Engineers of a number of state and county highway departments, reply—

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PUBLIC WORKS MAGAZINE

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ing to this query, agreed that it would. A California county engineer finds that plant mix, with an estimated life of 20 years, is cheaper in the long run than road mix, with an average life of 6 years. On a 50-mile-a-year resurfacing program he estimates that the use of plant mix would save more than \$14,000 the first year. Opinions vary with respect to particular advantages. North Dakota thinks that machine-laid plant mix would not necessarily be smoother than a blade-mixed surface. Kansas believes that there is nothing like a long-wheelbase motor grader, properly operated, for producing a smooth surface, especially where a leveling or wedge course is required for the job.

It was suggested that it may be more economical to contract for plant-mix surfaces than to purchase the expensive machinery required.

"Plant-Mix or Road-Mix Surfaces," *Better Roads*, November.

Laying Slag Bases

The Scottish Branch of the (British) Road Research Laboratory recently conducted some experiments in laying bases of blast furnace

slag, using crusher-run material from 2¼ in. to dust, by both spreader box and bulldozer. From these they concluded that: (1) A well-regulated base was produced more quickly with the spreader-box than with the bulldozer and with considerably less hand labor. The average output of the spreader-box was 100 tons per hour and was approximately double that of the bulldozer.

(2) The 8-in. base was usually built in two 4-in. thick layers, but no difficulty was experienced when spreading a 10-in. thick loose layer of coarse slag in one operation, and satisfactory penetration of fines was obtained during compaction. Laying in two layers did, however, assist in regulating the levels and in obtaining a good running surface.

(3) After initial rolling with the smooth-wheeled rollers (about 15 passes), two passes of the vibrating plate compactor increased the dry density of the base by 8 lb./cu. ft. to 131 lb./cu. ft. To achieve this dry density with the smooth-wheeled rollers, prolonged rolling over a period of two weeks was necessary.

(4) It was found that a uniform base was obtained more readily by

laying the coarse and fine fractions of the material separately.

D. B. Waters—"Some Recent Developments in Road Research," *The Surveyor*, Nov. 29.

Prestressed Beams In Bridge Construction

The Missouri State Highway Dept. has constructed a bridge, using beams that were not cast as single units, but were fabricated from pre-cast blocks, assembled, and stress applied by means of steel cables. There were two spans of 32 ft. 2 in. and one of 37 ft. 6 in. The blocks were 8" long, 15⅞ in. wide at the bottom and 3 in. less at the top, with top and bottom flanges extending 3 in. beyond the double web. At each end of a beam is a solid "loop-end" block, and in the middle of the beam 4-in. "position blocks" with a notch in each side just above the bottom flange. In assembling a beam for a 32 ft. 2 in. span, following an end block came 16 8-in. blocks, a 4-in. position block, 13 8-in. blocks, another position block, then 16 8-in. blocks and the other end block. A 1:2 mortar joint was placed between the blocks. A ¾" galvanized

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cable was placed along each side of the beam, in the notches in the position blocks and in a groove on each side of each end block. A tension of 10,000 lb. was applied to the cable, increased to 25,000 lb. in 30 minutes, and finally to 60,000. The completed beams were set side by side in the bridge and the space between filled with concrete through the 3 in. openings between the top flanges.

John W. Van Arsdale—"Pre-stressed Beams in Bridge Walk," *Better Roads*, November.

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Indentation Prevents Shippage Between Asphaltic Courses. By *A. H. Freer*, Bit. Engr., State Road Dept., Fla. November, Pp. 93-94.

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Traffic Control: A World System for Standardization of Road Signs. By *M. Andre Ramplier*, Dir. of Highways, France. Nov. 22, Pp. 757-759.

Some Recent Developments in Road Research. By *D. B. Waters*, Scottish Road Branch, Road Research Laboratory. Nov. 29, Pp. 773-775.

Leo Ritter

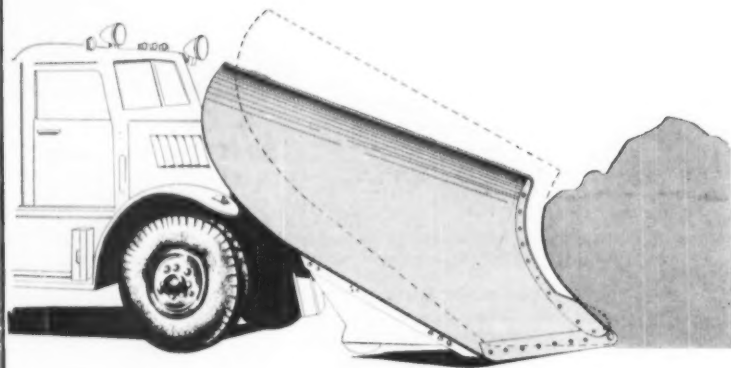
(Continued from page 10)

be an expert to win; emphasis is upon new and practical approaches to the solution of our highway problems. I know that a lot of you have been doing some hard thinking about our highway situation; be sure to put your ideas down on paper and turn them in. The contest ends March 1 and you can get an entry blank from your local GM dealer.

Testing Engineers, Please Note:

It looks as though highway engineers are becoming aware of the possibilities of the atomic age. The General Electric Company has announced the use of a "scintillation counter" in the laboratories of the Atlantic Refining Company in Philadelphia to detect film stripping of asphalt from aggregate in the presence of water. The general procedure followed is similar to that used previously in some stripping tests, except that the aggregate is soaked with radioactive calcium chloride before being mixed with the asphalt. If the asphalt films strip from the aggregate the calcium

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chloride dissolves in the water. After evaporation of the water the radioactivity of the residue is measured with the scintillation counter. Readings on the counter can be correlated with the behavior of the asphalt (or aggregate) in resisting film stripping.

Another straw in the wind is the announcement by the Michigan State Highway Department of the establishment of a radioisotopes section in their Testing and Research Laboratory. Object?—to explore the possibility of using radioisotopes in the routine testing of highway materials.

The Shape of Things to Come in '53:

Look for a marked increase in interest and activity in the snow-balling movement for the solution of the nation's highway muddle now that PAR (Project - Adequate Roads) is gaining headway; you can aid in this movement by taking leadership in the formation of active PAR groups in your state, county and community. Although a new federal-aid highway act will not be put before Congress for action until 1954, there will be no slackening in the drive in Washington for increased federal aid. Hopes for the future are running high in the wake of President-elect Eisenhower's vigorous statements.

More new toll roads will be approved in several states before the end of the year. Look for the Florida Turnpike to be among the first, since the state legislature meets this spring and the state will enjoy enlightened leadership under its new governor. There will be little change in contract prices for street and highway construction projects during 1953, barring a national emergency; sharp competition and increasing availability of steel and construction equipment will tend to stabilize the situation.

For Readers in the New York Metropolitan Area Only: A program of graduate courses in transportation engineering is being inaugurated by the College of Engineering at New York University. Registration for the first course, Highway Planning and Design, will be held late in January; this course will be given one night a week from February to June at the University Heights campus. Detailed information may be obtained by writing to Assistant Dean, Graduate Division, College of Engineering, New York University, University Heights, New York 53, N. Y.

A Word to the Wise: Let's get our sanding equipment, chlorides, snow-plows and the like out early this year—as soon as a snowfall begins. The situation will be a lot easier to control if you can manage to do so.

From Here and There: More than \$266 million of the funds derived from state highway-user taxes in 1951 were spent for non-highway purposes. New York State diverted about \$77½ million of its highway funds; Rhode Island led on a percentage basis, with about 51% diversion. Anti-diversion constitutional amendments were passed by

an aroused public in three states—Alabama, Arizona and Georgia—in the elections last November.

Plans are moving ahead on a proposal for the construction of a \$500,000 building to be erected by the Georgia Highway Department on the campus of the Georgia Institute of Technology in Atlanta; a portion of the building will be devoted to highway research. Look for major developments in this field at Tech under the leadership of R. J. Paquette.

The annual convention of the American Road Builders' Association will be in Boston, Feb. 9-11.



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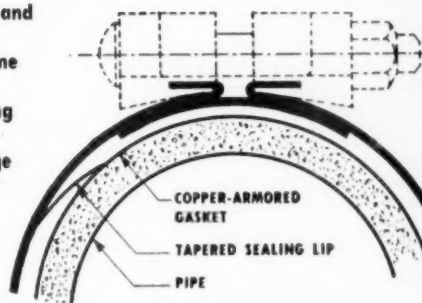


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PUBLIC WORKS

DIGESTS

THE SEWERAGE AND REFUSE DIGEST

Rotary Tubes for Trickling Filter Studies

In investigating some of the characteristics of trickling filters, the authors used, instead of miniature filters, a laboratory "equivalent," consisting of a series of plastic (Lucite) tubes 24 in. long and $2\frac{1}{4}$ in. inside diameter, inclined slightly from the horizontal, rotated at 16 r.p.m. Industrial wastes were fed into the upper end of each tube and discharged at the lower end, flow-through time being varied as desired by changing the slope angle of the tube. It was found that the functional performance of these tubes was very close to that of equal wetted areas of conventional trickling filters. The microbiological slime film growths on the interior walls of the tubes are identical to those on stones of conventional filter beds. At a dosage rate equivalent to 8 mgd on a trickling filter, they removed about 85% of 250 ppm B.O.D. Compared to trickling filters, they take up less space, are more easily maintained, the effective active surface is directly measurable, active slime can be removed for studies, and they do not clog.

Earnest F. Gloyna, Robert F. Comstock and C. E. Renn—"Rotary Tubes as Experimental Trickling Filters;" *Sewage and Industrial Wastes*, November.

Disposal In Lagoons

Seven small North Dakota communities have operated sewage lagoons with such success that the State Dept. of Health approves this type of final disposal. It recommends the purchase for present and future lagooning of 30 or 40 acres of land; lagoons built in 10-acre units; discharging the sewage in the centre of a lagoon 3 to 5 ft. deep; absence of shallow marginal areas, and keeping the sides of the lagoon free of weeds and brush to permit maxi-

mum wind action; and fencing to keep out animals. One lagoon has been in operation for 24 years without appreciable decrease in capacity or in efficiency of seepage rates.

"Sewage Disposal by the Lagoon Method;" *Sewage and Industrial Wastes*, November.

Fish for Testing Toxicity

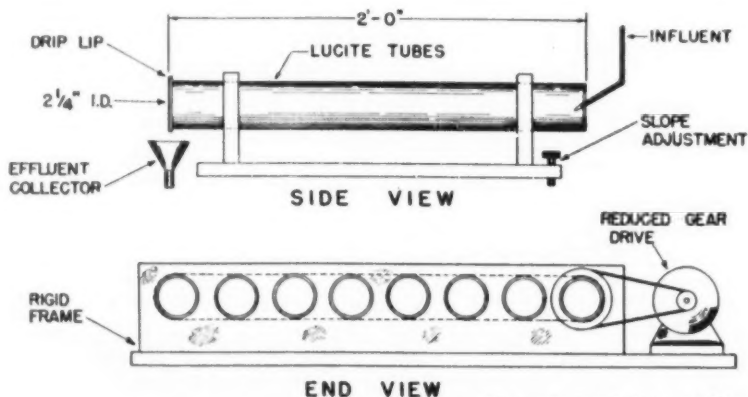
A chemical manufacturing plant which makes about 100 different chemicals, in developing a program for treating the various wastes, began by attempting to determine the toxicity of each to fish and animal life, and the concentrations of each below which they are not toxic and above which they are; the range between these, called the "critical range," is defined as the range in concentration, in ppm, below which four fish retained in the test solution for 24 hr. all lived and above which four similar fish all died. The fish used were creek chub 3 to 4 in. long. In testing each chemical, a number of 1-gal. glass jars were filled with different concentrations of the chemical and 4 fish placed in each. The temperature and dissolved oxygen content were maintained constant. The critical ranges were

found to vary from 4-10 ppm for sodium hydrosulfide, to 16,000-30,000 ppm for urea. The seven most dangerous contaminants of effluent water were found to include the simple alkyl amines. By adjusting the pH of the effluent water to 7.0 to 7.5, the highly toxic materials would be reduced to 4-phenol, sodium hydrosulfide, Nonic 218 (a trade name) and 1, 3 dibutylthiourea.

Leslie A. Gillette, Dwight L. Miller, and H. E. Redman—"Appraisal of a Chemical Waste Problem by Fish Toxicity Tests;" *Sewage and Industrial Wastes*, November.

Enzymes for Improving Sludge Digestion

Houston, Texas, treats 90% of the sewage of the city in two large activated sludge plants. The remaining 10% is treated in eleven small plants with capacities of 20,000 to 2,000,000 gpd, located on the periphery of the city. These will be abandoned as soon as interceptor sewers can be extended to them. Meantime several of them are severely overloaded, but, because they are scheduled for early abandonment, enlargement of them cannot be justified economically. In



Courtesy *Sewage & Industrial Wastes*
● ROTARY tubes are used for trickling filter studies.

efforts to operate them to the best advantage meantime, the city has made a trial of the use of commercially produced bacteria and enzymes in a badly overloaded digester at the Oak Forest plant. This digester has a capacity of 3 cu. ft. per capita on design basis, but only 1 cu. ft. on the basis of the present contributing population. The material used, "Bionetic," is described by the manufacturer as "consisting of preserved living cultures of select anaerobic organisms, activating factors from mould sources, and potent aerobic digesting organisms, together with enzyme systems and other undefined bio-catalysts." Beginning May 30th and continuing through July 9th Bionetic was added to the digester at rates of 2 to 5 lb. per day. After the first week there was a decrease in the supernatant BOD from the previous average of 1782 ppm to 719; in suspended solids from 1908 ppm to 328; and an increase in pH from 5.9 to 6.5. The improvement continued to exist for 60 days after the treatment had been stopped. Also there was a definite decrease in the quantity of sludge drawn. The Superintendent of Sewage Treatment says that "The expected results from, and costs of, biological additives are still not well established, but a cautious appraisal of possible benefits is justified."

A. C. Bryan—"How Enzymes Improved Sludge Digestion;" *PUBLIC WORKS*, December.

House Fly Breeding In Treatment Plants

Prolific breeding of the house fly, *Musca domestica*, at several Texas sewage treatment plants in 1951 led to a study of the causes and remedies by the State Dept. of Health. Fly breeding was found to occur in inadequately digested sludge in drying beds; in lagooned sludge from overloaded plants where the sludge drying bed capacity was inadequate; in detritus accessible to flies; in the accumulated scum layer on top of open sludge digestion tanks and in the gas vents of neglected Imhoff tanks. The breeding is proportional to the amount of incompletely digested sludge that is accessible to flies for a period of 8 days or longer during the breeding season. To control the breeding, standard chemical control procedures were tried, but with only minor reduction of breeding. Consideration was given to reduction of drying time on the sludge beds. Commercial alum applied to the sludge as it flowed to the drying beds at the rate of 1 lb.

per 100 gal. of wet sludge gave spectacular results; sludge depth on a bed dropped 8.5 in. in the first 24 hr. and developed a fairly dry crust, while untreated sludge on adjoining beds dropped less than 1 in. after standing 5 days. The sludge so treated was not attractive to flies and also permitted removal of the sludge before fly development could be completed, and fly breeding was effectively abated. Inspection of numerous plants revealed that fly breeding normally does not occur in properly digested sludge.

F. J. Von Zuben, Jr., L. J. Ogden, and R. E. Peel—"House Fly Breeding at Sewage Treatment Plants in Texas;" *Sewage and Industrial Wastes*, October.

Sludge Drying At Baltimore

Baltimore, Md., is now constructing, at a cost of \$2,000,000, a plant for drying the sludge produced at the Back River sewage treatment plant. It is planned to sell the dried sludge, not in competition

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with fertilizer manufacturers, but by contract to brokers who will sell it to the manufacturers. The price is expected to approximate \$10 a ton. It is calculated that the cost of production will be about \$13 a ton. In 1949 bids were asked for furnishing rotary dryers; only one bid was received and that was unsatisfactory. In 1950 a contract was let for three flash-drying units. These will receive vacuum-filtered sludge of 75% moisture, brought by belt conveyors. After being dried, the sludge will be screened on vibrating screens to remove all particles above $\frac{3}{8}$ -in.

Then screw conveyors and bucket elevators will carry it to storage bins. The spent vapors from the process are to be discharged into a stack 350 ft. high to insure elimination of odors, which had previously caused complaints and law suits.

A. R. Vollmer—"A Sludge-Drying Plant for Baltimore, Md.," *American City*, October.

The Spirovortex Activation Treatment

In the conventional activated sludge plant, much of the air supplied—up to 90% in some cases—is

used to keep the sewage-sludge mixture agitated, while only a small part is actually utilized for biologic oxidation. For several years experiments have been conducted in pilot plants at Santa Clara, Palo Alto and other California municipalities, using the natural mixing action that occurs in a circular tank wherein the flow enters tangentially at the top and is drawn off centrally at the bottom. It was observed that the folding in of the resultant vortex and the surface reaeration due to the internal currents maintained the sludge in an aerobic condition in small tanks, but in large tanks other methods of inducing air were necessary. To meet this necessity a "superate biofilter" was devised—essentially a biologic filter bed about one foot deep over which the contents of the mixing tanks is recirculated at extremely high rates. Plants embodying these ideas are under construction in California. One for treating industrial wastes has been in operation since March, 1951 at Turlock. This includes a Dorr "Vacuator," primary and secondary mixing tanks, primary and secondary hydraulic jump aerators and a final clarifier. It is used for treating 3 mgd of wastes from canneries, dehydrating plants and poultry processing plants. This plant removes 60-80% of BOD and 80-95% suspended solids. The total average power requirement is 0.06 kw-hr. per pound of BOD removed, as compared to 0.50 kw-hr. for a diffused-air activated sludge system.

John H. Jenks—"Spirovortex Activation Treatment," *Wastes Engineering*, December.



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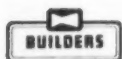
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Sanitary Fill in Seattle, Washington

At present there are four sanitary fills in operation in Seattle; two on city land, one on property of the University of Washington, and one on private property. These are converting marshy regions and low tide lands into park, building and playground tracts. Fills already have been used for libraries, an athletic field house, parking lots, and warehouses and other commercial buildings. The operation of the fills as well as collection of refuse is contracted for a five-year period. The work is under the constant supervision of the city engineer, and the Public Health Dept. makes periodic checks on the fills. It is estimated that during 1952, 291,000 tons of garbage and rubbish will have been placed in the four fills, and 150,000 cu. yd. of earth used for covering it.

The city pays the contractor for the earth used by the cubic yard.

R. F. Karolevitz—"Sanitary Fills Pay Off in Seattle;" **PUBLIC WORKS**, December.

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Better Plant Operation with Laboratory Control, By *F. H. Wellington Gilcrease*, New York State Dept. of Health, December, Pp. 661-663.

Control of Sludge Quality, By *Leroy W. Van Kleeck*, Prin. San. Engr., Conn. State Dept. of Health, December, Pp. 664-666, 673.

Water & Sewage Works

Utilization of Sewage Sludge, By *Le Roy W. Van Kleeck*, Prin. San. Engr., Conn. Dept. of Health, November, Pp. 463-467.

Supercharged Dual Fuel Engines at Nassau County Sewage Works, By *H. L. Kachrie*, Worthington Corp., November, Pp. 470-480.

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Functional Aspects of Sewage Plant Instrumentation, By *Jack M. Betz*, Civ. Engr., Bureau of Engineering, Los Angeles, Calif., November, Pp. 1325-1338.

Proposed Sewage Works Improvements at Toledo, Ohio, By *Thomas B. Henry*, Cons. Engr., November, Pp. 1339-1348.

A Quarter Century of Sewage Treatment in the Central States, By *F. W. Mohlman*, Dir. of Laboratories, San. Dist. of Chicago, November, Pp. 1349-1354.

Rotary Tubes as Experimental Tricking Filters, By *Earnest F. Gloyne*, *Robert F. Comstock* and *C. E. Renn*, Johns Hopkins Univ., November, Pp. 1355-1357.

Statistical Analysis of Tricking Filter Data, By *John M. Fairall*, Pub. Health Engr., State Bd. of Health, Wis., November, Pp. 1358-1360.

Aeration Efficiency and Design: Design from Pilot Plant Data, By *H. Wesley Eckenfelder, Jr.*, Cons. San. Chemist., November, Pp. 1361-1367.

Pollution Abatement Through Water Conservation: A Symposium, In Steel Mills, By *G. A. Huxell*, U. S. Steel Co., In Oil Refineries, By *R. V. Simonson*, Standard Oil Co. of Ohio, In a Chemical Plant, By *John Ludden, Jr.* and *John F. Vogler*, Calco Chemical Div., November, Pp. 1368-1381.

Treatment and Re-use of Water in Beet Sugar Manufacturing, By *George S. Fleming*, Supt., Buckeye Sugar Co., November, Pp. 1382-1388.

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Appraisal of a Chemical Waste Problem by Fish Toxicity Tests, By *Leslie A. Gillette*, *Dwight L. Miller* and *H. E. Redman*, Sharpless Chemicals, Inc., November, Pp. 1397-1401.

White Water Treatment: Factors Affecting Digestion Efficiency, By *Willem Rudolfs* and *Herman R. Amberg*, Rutgers Univ., November, Pp. 1402-1409.

What's Right With My Plant, By *Edwin A. Locke*, Operator Sewage Treat. Plant, Hartford, Conn., November, Pp. 1410-1415.

Ohio Experience with Sludge Heat Exchangers, By *James H. Blodgett*, Supt. treat. plant, Columbus; *Resler H. Calihan*, Asst. Supt. treat. plant, Dayton; *George S. Long*, Chief Supervisor of treat. plant, Akron, November, Pp. 1416-1424.

Doc Symons

(Continued from page 14)

Convention" and the 1909 program said, "29th Convention," but I never did see Harry's answer.—Let's see, now, if the 75th (Diamond Jubilee) Convention is to be held in St. Louis in 1956—then the 29th convention should have been . . . but that was before the Jordan Era.

* * *

McCarthyism—Sewage Variety — Joe McCarthy, Head of the famed Law-

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rence Experiment Station in Massachusetts, said at one time, that the Lawrence Station has conducted 150 years of trickling filter experiments since it was founded in 1886 and that the first high rate filter experiments were conducted in 1893.

Names Make News — Take a good look at the picture of the man on the front cover of this issue of *Public Works*. Such distinction couldn't happen to a nicer guy than Don E. Bloodgood, Prof. of Sanitary Engineering at Purdue University—and I knew him when we were in school together at the University of Wisconsin, along with George Martin, Supt., Green Bay Wis. Metr. Sew. Dist.—Among Don's other ac-

complishments and pursuits, he writes a neat one-sheet monthly paper titled, "Sanitary Engineering News". You should be on his mailing list!

* * *

Small World No. 18! — Even my friends here in Westchester County know of my fondness for Wisconsin cheeses and one of them invited us (my girl, Va. and I) to partake of cheese and to meet some folks from Green Bay, Wis.

Of course, I asked, Col. Wm. H. MacDonald, who heads the Wis. Pub. Service Co., in Green Bay, if he knew Harold Londo, Supt. of Water or George Martin, Supt. of Sewage.—"Rather", he replied, "I am Chairman of the Water Works

Commission and I took on the job at the urging of George Martin who retired from the position last year"—And I meet him in Bronxville, N. Y.—Small World!

* * *

News Notes From Brushy Bend — The North Shore Water Producers Assn., met in October in Wilmette, Ill. Seventy four were present. George Prindle, the Highland Park, Ill., punster is secretary.

The Genesee Valley Section of the NYSSIWA held its fall meeting in October at the Barnard Exempt Fireman's Club in Rochester. Choice of meals ranged from a fish fry at 85 cents to a selection of three meats for \$2.00. The meeting was held in the Ratskeller with the showing of two pictures: "H₂O-NY" and "The Dorr Way". Fran Cramer of Rochester is Chairman, and Glen Pinkney of Webster is Secretary.

The Westchester Water Works Conference held its autumn meeting in November in Ossining, N. Y., with a roast beef dinner (seconds on the beef), a short business meeting, and progress reports on mutual aid, and the county water authority. Cost—\$3.00 including beer and gratuities. R. M. McLaughlin of the Westchester Health Dept. is Secretary.

The Metropolitan Section of the NYSSIWA held its annual business meeting in December at the auditorium of the City Health Dept. Talks were given by A. B. Mindler of Permutit Co. on Ion Exchange in Waste Treatment and by Anton Sparr, Supt. Nassau County D.P.W. Bay Park Plant, on Sewage Treatment in Nassau County.—A number of persons joined together for supper at the Pearl St. Restaurant before the meeting.

(Note to Secretaries of local sections and small W & S groups, please put V.T.Y. on your mailing list.) —V.T.Y.

"Doc" Symons, 86 Edgewood Ave., Larchmont, N. Y.

• • •

Sewer Cleaning Problems

Besides cleaning 27,175 feet of pipe sewers, and 14,180 feet of ditches the personnel of the Division of Sewers of Newark, N. J., was called out 27 times to recover from sewer basins, false teeth, cigarette lighters, a \$10 bill, earrings, a diamond ring, and other articles. Ten dead animals also were removed from basins.

Shorewood Hills Will Grind Its Garbage



● SIGNING the contract for better garbage disposal in Shorewood Hills.

THE Village of Shorewood Hills, Wis., a suburb of Madison, has let a contract for the installation of domestic garbage grinders in all village homes. This decision was made after a careful and thorough investigation of the entire problem. The village has a population of about 1,700, in 475 homes. It includes only a small commercial and industrial area.

A committee of four village trustees and the engineer-manager studied the problem. Investigation of the sewer mains and laterals showed they were wholly adequate to carry the added 2 to 3 per cent of flow which would be caused by grinding the garbage, and the gradients were sufficient to prevent any danger from clogging. There

were a few septic tanks; it was felt that those of adequate capacity would probably not be affected; and those that were inadequate would need more frequent cleaning. Grease traps, once required by ordinance, would have to be bypassed.

The village is part of a metropolitan sewerage district, and it was found that the small additional load of organic matter, probably 15 per cent to 30 per cent more, would not adversely affect the operation of the treatment plant. The village had previously been contributing 0.69 per cent of the total flow, or 99,340 gpd.

The contract was awarded to the General Electric Co. The units will be purchased by the village, which will retain title and install them in all homes in the community. Payments will be made from village funds over a period of ten years. Annual amortization cost over the ten-year period will be about equal to the current yearly cost of garbage collection and disposal. The work of installation began late in the fall of 1952 and will require about eight months for completion.

Since the village will own the units, it will have to service and maintain them. The only charge to the users will be for service repairs due to negligence. A separate electrical circuit was provided to prevent overload. Units will also be installed in the church, country club and school. Acceptable units now owned by residents will be purchased from the owner by the village at a fair price.

Vermont Training

(Continued from page 68)

one year of experience they may be advanced to the grade of Junior Engineering Aide, with a starting salary of \$45.90 per week and a top salary of \$59.80 per week, subject to passing an examination.

Applicants with one year of experience or with additional education in excess of high school were started at a salary of \$32.10 per week, advanced to \$39.00 per week at the end of the four-week period and will be advanced to the next grade at \$45.90 per week at the end of six months field training, subject to passing the Junior Engineering Aide examination.

Applicants with two years experience or additional education were started at a salary of \$39.00 per week, advanced to \$40.70 per week at the end of the four-week period and to \$45.90 per week at the end of six months, subject to an examination.

The advance of these trainees beyond the grade of Junior Engineering Aide is dependent upon the satisfactory service they perform and their ability to pass examinations for high grades after they have sufficient experience.

The Department is now working out the details for another engineering course on a higher level, to supplement this basic training. The new course will give the trainees, and other engineering employees of the Department, opportunity to advance themselves in their chosen engineering profession.

Officials of the Department all believe that this first training course has been well worth while and has developed several potentially good engineers. When the course is given again undoubtedly the formal instruction will be of six weeks duration instead of four weeks so that more instruction and practice may be devoted to plane surveying. A class of not over fifteen is judged to be the proper size.

The salaries of the instructors and trainees were paid from the Department's engineering funds.

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Garbage Grinding

(Continued from page 53)

not finally established until late in the fall of 1950, by which time about 800 grinders had been installed. Therefore, it was not possible to obtain data on the performance of the plant before the grinders were installed.

During the Aug., 1950, test period, average raw sewage BOD was 362 ppm and suspended solids 381 ppm. The final effluent contained 44 ppm BOD and 40 ppm SS. In the October, 1950, test period, BOD was reduced 84 per cent from 410 ppm in the raw sewage and SS were reduced 90 per cent from 426 ppm. In the May, 1951, period, reductions were 90 per cent and 91 per cent from 387 ppm BOD and 420 ppm SS.

Efficiency of primary sedimentation units appeared to be unusually high, the average suspended solids removal ranging from 68 to 75 per cent during each of the three sampling periods—August and October, 1950, and May, 1951. BOD removal during periods when supernatant was not being returned to

the primary settling tanks, averaged 40 per cent. There was no indication that these efficiencies would not continue under normal operation. Results of analyses for a limited period indicated raw sludge solids concentrations of 4.6 to 7.4 per cent (average 5.8 per cent for 6 days) during a period when no waste activated sludge was present. This dropped to 3 to 4 per cent in the presence of waste activated sludge. Volatile solids content averaged 72 per cent without activated sludge and 71 to 76 per cent with it.

Effects on Flies and Rodents.—Fly densities were obtained in 48 blocks in August and September, 1950, and in 26 blocks in June and September, 1951. The Scudder fly-grill method of sampling was employed, using an 18-inch grill. As a control for comparison, similar surveys were made at Huntingburg, seven miles south of Jasper, a community having the same characteristics. These surveys showed a lower average number of flies per grill count in Jasper than in Huntingburg. This difference was considered to be related to the difference in garbage handling. Both cities contained open dumps, animal pens, rubbish, etc., which were notice-

able sources of fly breeding. There was a large increase in the number of flies at the Jasper dump between June and September, 1951, probably due to the increased use of the dumps by homeowners without garbage grinders.

Two rodent population surveys were made, one in April-May, 1950, the other in June, 1951. The open dump was found to be a major source of rodents; other sources were animal pens and storage sheds which furnished harborage. In the residential section of the city, the rodent infestation decreased considerably between the surveys; it is believed this was due largely to the installation of garbage grinders.

As to the morbidity and mortality trends, records of these indicated that the number of cases of sickness and/or death attributable to faulty sanitation practices reported for Jasper and for Dubois County were so few that it was not possible to utilize these data for determining health benefits due to this method of garbage disposal.

Briefly stated, the studies showed that there was no increase in water consumption; there appeared to be no deleterious effects on the sewers; there was a considerable increase in

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the organic load, BOD and grease; but this did not prevent unusually high efficiency in the sedimentation units. Results of secondary treatment were erratic, but the plant had not yet reached a stage of normal continuous operation. Study of its operation is being continued and results will be reported on later.

Holes Without Holdups (Continued from page 51)

(1) Barricades—These are important from a protection standpoint and should be placed to provide safety of operation while offering least inconvenience to the public. They should be rearranged as conditions permit to provide the minimum interference with surface traffic flow.

(2) Time of Work—The heaviest movement of surface traffic is between 7 and 9 in the morning and 4 and 6 in the afternoon. Mondays through Fridays are the days of heaviest traffic flow. These factors should be given consideration and every reasonable effort made to program the work so that it will be done with least interference with traffic consistent with the nature of the work and of the cost and utility to the public.

(3) Work Equipment—Whatever equipment is necessary to do the work should be placed where it will meet the requirements of the job and at the same time keep interference with traffic at a minimum.

(4) Motor Vehicles—There are two parts to this problem—the work vehicles and the employee-owned vehicles. Consideration should be given to the need of work vehicles at the site of the excavation. If not required in the actual work, they should be placed on side streets or where they will not block the flow of traffic. Employee-owned vehicles placed near the site of the work may constitute a considerable barrier to traffic and some other location should be found for them.

(5) Toe-Boards—Where traffic flow is heavy, the use of toe boards or bins to prevent spreading out of the spoil from the excavation will reduce the space it is necessary to occupy. Their use may often result in another lane being available to traffic.

(6) Steel Plates—Steel plates are of value at street intersections, driveways and walks and on those portions of streets where it is required to permit the passage of vehicles or pedestrians, particularly where the work is stopped.

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(7) Premix Surfacing—Experience has developed the need and use for premix or black-top surfacing for the temporary repair of paving where excavations have been made.

Manholes

The necessity for opening manholes continues during the entire period of the structure's use. Some utilities, such as those of the power or telephone company, may need to be opened oftener; and the need for such more frequent opening is greater. Where these manholes are in the streets, as they often are, they tend to become a recurring incident in traffic interference. Proper planning of the work and preventive maintenance, where this is applicable, may reduce the frequency of need for opening them.

Investigations of surface traffic movement around open manholes have disclosed many unnecessary interferences with traffic. Among these are improper placing of barricades; the parking of motor vehicles too close to the open manhole; and the location of work equipment, as splicing carts, improperly from the traffic viewpoint. However, if proper consideration is given to these factors and to the "how" and "where" of the placing of traffic signs and barricades, traffic can move with reasonable speed past the obstruction.

The comments listed under "excavations" generally apply with equal force to open manholes; but some additional factors exist. Barricades should be kept, so far as possible, in the lane of traffic obstructed by the open manhole. In many cases they may be set so as to direct traffic to both sides of the opening. A barricade placed between the open manhole and the curb hinders traffic and gives no additional protection to the worker except in his travel to and from the curb. And this travel can often be reduced very materially with a little planning.

Emergency repair work in open manholes may be necessary at any time, even in the rush hours. It should be possible, however, to program routine testing or certain construction work so as to keep manholes from being opened for these reasons during morning and evening heavy traffic periods. When emergency repair does necessitate work during a busy traffic period, every effort should be made to keep interference with traffic at a minimum.

An especially dangerous situation

develops when either excavation work or open manholes forces motor vehicle traffic across the center line of the street. Every consideration should be given to avoidance of such conditions; if avoidance is not possible, careful handling of the traffic is necessary to prevent accidents.

Temporary and Permanent Resurfacing

Trenches left with tamped dirt as a surfacing material are not satisfactory for motor vehicle travel. Premix or black-top is of considerable value as a temporary resurfacing material. After proper placement on a compacted fill, the surface remains relatively firm and carries traffic well. It must be replaced within a reasonable time, of course, with a permanent type of surfacing. Proper follow-up to see that the temporary surfacing is replaced with permanent pavement is important.

Proper use of steel plates will reduce traffic interference, not only over an open trench or hole during heavy traffic periods, but during periods when no work is being done, as at noon, nights, or weekends. The plate should be sufficiently heavy to carry the loads that may be placed on it. Angle cleats should be placed on the under side to prevent displacement under traffic; and the edges of the plate should be sealed to the street surface with firmly tamped premix.

When it is necessary to force traffic out of its usual lane, a very thorough job of marking the course to be followed should be carried out. It may be necessary to use barriers, rubber cones, lights and "keep right" signs. The public should never be left in doubt as to where it should go or how it is to get past the obstruction.

The data on this article are taken from the booklet "Surface Traffic Interference" which was prepared by a Subcommittee under the direction of the Substructure Committee of Los Angeles, Calif. Chairman of the Subcommittee was W. E. Alexander; members were B. M. Lauthere, E. W. Breitzkreutz, C. G. Gunnerson and J. C. Hawe. H. H. Cox was chairman of the Special Committee on Surface Traffic Interference. The illustrations are from the booklet. Copies of the booklet can be obtained for 14 cents each from the Department of Water & Power, Power Operating & Maintenance Division, Box 3669 Terminal Annex, Los Angeles 54, Calif.

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Public Works

EQUIPMENT

NEWS

How to Prevent Septic Tanks from Clogging

Clogging of septic tanks has been eliminated, it is claimed, by addition of a compound which is stated to reduce organic waste continuously to a liquid. It is said that a single application per year is sufficient to prevent clogging and that this eliminates the need for pumping out the tank. The product is called Formex, and it is claimed that it will not affect metal, vitrified or cement pipe. One quart will do the job, according to The Fermex Co., 11 Hill St., Newark 2, N. J.

Use coupon on page 24; circle No. 1-1

★ ★ ★

Drives Posts for Guard Rails, Snow Fence and Signs

Mounted on a trailer, jeep or tractor and operated by a gasoline engine or power



Power post driver

take-off, this post driver will set steel or wooden posts in most any kind of ground—even rocky or frozen. It will drive posts to 4-inch diameter without sharpening. It tilts to any angle for driving on hillsides or in rough and uneven ground. Inverting the

driver head converts it to a pavement breaker or earth tamper. One man can operate it readily, and can set posts in half the usual time. Particularly valuable for highway maintenance and for construction work. Full data from Driver Dep't., Danuser Machine Co., Fulton, Mo.

Use coupon on page 24; circle No. 1-2

★ ★ ★

For Faster and Better Water Meter Reconditioning

The Wheelabrator Tumbblast, with a 2-cu. ft. capacity, gives complete cleaning of rust and corrosion from water meter parts, permitting complete reconditioning. It takes 15 minutes to clean one load of about 20 of the 5/8-inch size meters, using this "airless blast cleaning" method. Full data for any water works man from American Wheelabrator & Equipment Corp., Mishawaka, Indiana.

Use coupon on page 24; circle No. 1-3

Huber Side-Dozer Cleans under Guard Railings

Add to the dozer family: Here is a side-dozer for scalping berms and shoulders under

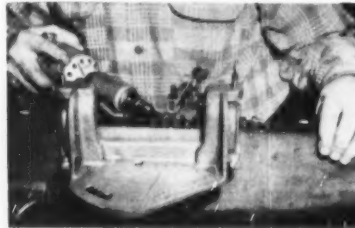


guard railings, a job which previously has had to be done by hand labor. Power is hydraulic. Cutting blade is 48 ins. long, 6 ins. high and a half-inch thick. It will scrape cleanly and efficiently under any guard rail that is 6 inches above ground. Maximum reach is 72 ins. This new device is mounted on the 42½-hp Huber maintainer. Fine description in Bulletin M-155, Huber Mfg. Co., Marion, Ohio.

Use coupon on page 24; circle No. 1-4

Sharpener Makes Power Chain Saws Cut Better

This is a portable chain saw sharpener which precision-sharpens all makes of chisel-



tooth chains to the correct horizontal and vertical angles, cutting the teeth to equal lengths. It will do this job in less than 20 minutes and is claimed to cut labor costs 75 per cent. The carbide burrs will sharpen more than 100 chains and can then be re-sharpened themselves without loss of size at a fraction of the original cost. Detailed information from Meakins-McKinnon, Inc., Lockport, N. Y.

Use coupon on page 24; circle No. 1-5

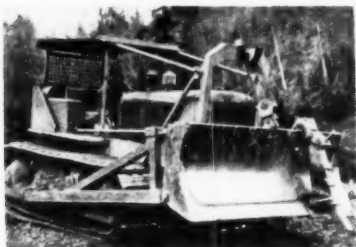
Spreads Cinders Half-Road or Full-Road Width

This is a truck-mounted cinder spreader, which spreads half or full width of the road



and is controlled from the cab by a single driver-operator; but it also may be controlled manually. It is of the conveyor and spinner type, driven by a power take-off from the truck transmission. A preheater from the truck exhaust line eliminates load hang-ups in freezing weather. Standard hopper sizes are 5 and 9 cu. yds. Especially designed for snow and ice control. Full data from Hercules Steel Products, Galion, Ohio.

Use coupon on page 24; circle No. 1-6



Dozer-Rooter for Stump and Boulder Removal

Also, in addition to stump and boulder removal, this new unit tears up old pavements, rips overburden, cuts seamy rock, clears land and opens ditches. It consists of a heavy-duty tooth housing which mounts on the moldboard of the bulldozer blade by means of a special clamp. Four adjustments of depth are possible. Rooters can be attached in pairs or used singly. Mounting and demounting are quick and easy. A four-page folder will give you more interesting data. Ask for Folder 194 from Electric Steel Foundry Co., 2141 NW 25th Ave., Portland 10, Oregon.

Use coupon on page 24; circle No. 1-7

Jet Flame Gun for Thawing, Burning Weeds and Heating

This ring-type generator is small, it can be carried by one man easily; it holds 2 gal-



lons of fuel; and it is particularly adapted to such jobs as thawing manhole covers, burning weeds, heating sand, breaking rocks and thawing frozen ground. It builds up a terrific volume of heat—in excess of 2000°F and consumes about a gallon and a half of fuel per hour, using either kerosene or distillate. Full data from Cedarburg Mfg. Co., Minneapolis 15, Minn., or use the coupon.

Use coupon on page 24; circle No. 1-8

For Metering Liquid, Air, Gas or Steam Flows

This "Flo-Watch" will measure the flow through such standard differential producers as Venturi tubes, nozzles and orifices, Ken nison open nozzles, flumes and weirs. It can be used for any combination of totalizing, indicating and recording functions. Also, it can be made to actuate a second instrument or pace a chemical feeder remotely located. Ask for Bulletin 300-J14 from Builders-Providence, Inc., 345 Harris Ave., Providence, R. I.

Use coupon on page 24; circle No. 1-9

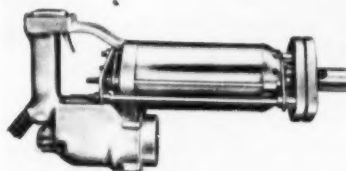
Pipe Repair Clamps With Stainless Steel Coating

A coating of stainless steel in plastic suspension provides much greater protection against corrosion; and, in addition, these clamps use stainless steel bands. They are claimed to provide a permanent repair for leaks, blowouts and short splits in all types of pipe—steel, OD, cast iron and asbestos-cement. With this clamp, installation under water or in difficult places is easier. The clamps are available in sizes from half-inch to 24-inch pipe. Ask for Bulletin 452-G, Adams Pipe Repair Products, Box 21, El Monte, Calif.

Use coupon on page 24; circle No. 1-10

For Drilling Holes in Concrete and Masonry

A new 2-inch capacity heavy-duty electric hammer drill is announced by Syntrol. It is

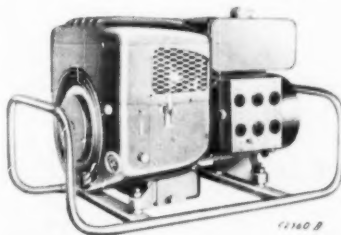


designed to speed up quantity hole drilling in concrete and masonry. It combines an electromagnet hammer with automatic rotation of a carbide-tipped drill bit. The hammer delivers 3600 blows per minute. Fuller information from Syntrol Co., 660 Lexington Ave., Homer City, Pa.

Use coupon on page 24; circle No. 1-11

5,000-Watt, 180-Cycle Portable Electric Plant

This 180-cycle gasoline driven generator is designed to operate high-frequency electrical work tools. At unity power factor, it



provides 5000 watts of AC, 230-volt, 180-cycle, 3-phase power, or 3,000 watts, 230-volt, 180-cycle AC plus 2,000 watts 115-volt DC. It weighs 270 pounds. It is manually started. Complete information on Form A288. D. W. Onan & Sons, Inc., Minneapolis 14, Minn.

Use coupon on page 24; circle No. 1-12

7 IMPORTANT ADVANTAGES IN SEWAGE TREATMENT

with the

Spiragester



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1. Low construction cost.
2. Easily converted to a digester with separate primary in case of plant expansion.
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4. Sludge creepage up tank walls is not a problem.
5. Foaming minimized and digestion improved by recirculation system.
6. Settling is improved by long SPIROFLO detention.
7. Easy to clean out.

Available in 4 types: Straight wall, offset wall, Tanks with sludge stirring mechanism, Steel cone slopes of 52½ to 60 degrees.



Write today for Bulletin 124 with full details.

LAKESIDE ENGINEERING CORP.
222 West Adams Street
Chicago 6, Ill.

Hydraulic Rear-End Loader for Motor Trucks

With a load capacity up to 2,000 pounds, this rear-end loader can be of great use in handling valves, castings, hydrants, large sewer pipe and many similar items into a truck. It is adaptable to all trucks of 1½-ton size and larger and is made in four sizes. Operation is by hydraulic power from a power take off. For full details, write for Bulletin 652-L from Galion Allsteel Body Co., Galion, Ohio.

Use coupon on page 24; circle No. 1-13

★ ★ ★

Sludge Gas Metering Device Operates at Low Head Loss

Sludge digester gas can be measured with this meter with a permanent head loss of as little as one-half of an inch of water. Its use assures an accurate and continuous measure-



ment of gas production; and it totalizes the amount of gas supplied by the digester. The meter is available in ranges of 1, 2.5, 5 and 10 inches of water and can be equipped to operate in hazardous atmospheres. The case is weatherproof for outside installations. Ask for Engineering Data Sheet 833-11 from the Foxboro Co., Foxboro, Mass.

Use coupon on page 24; circle No. 1-14

★ ★ ★

For Melting Joint Compound, Asphalt and Tar

These furnaces burn L-P (liquefied petroleum) gas, commonly known as bottled gas. They have a wide range of heat regulation and are economical to operate. The flame does not impinge on the pot, so that even heating and long pot life are obtained. There is no carbon formation. They are designed for melting and heating joint compound for sewer and water lines, for pipe protective enamel and for heating asphalt and tar for expansion joint filling and for small patch work. Bulletin 1077 gives essential information. Write Hauck Mfg. Co., 124-36 Tenth St., Brooklyn 15, N. Y.

Use coupon on page 24; circle No. 1-15

★ ★ ★

Protective Device for Use When Thawing Water Pipes

This device gives an engine-driven welding machine protection against overload damage when the machine is being used to thaw frozen water pipes. The "Linc-Thaw" hooks into the output circuit line of the welder

and indicates at all times what current is passing through. A fuse also limits current output to the rated maximum for the generator on continuous duty. It is available in several current ratings for engine-driven welders of 200, 300 and 400 ampere capacity. Full data from Lincoln Electric Co., Cleveland 17, Ohio.

Use coupon on page 24; circle No. 1-16

★ ★ ★

Vandals Can't Damage these Fiber-Glass Signs

Vandals, heat and cold, sun and rain, wind and weather do not adversely affect these municipal signs. They are made of fiberglass integrally molded with weatherproof resins of desired color and finish, so that the color is entirely throughout the sign. Thus they are extremely resistant to damage, fading and peeling. Blanks are available for cities having their own sign shops; and complete signs, either plain or reflectorized, are warehoused at convenient points. For fuller information on these new signs, write Dura-Signs, Box 740, Erie, Pa.

Use coupon on page 24; circle No. 1-17

★ ★ ★

High Strength Fibreglas Pipe is Introduced

Known as "Spiral-Glas", this new Fibreglas pipe is high in strength due to the method of construction which uses opposing spirals of material, wrapped under tension. Test pressure ratings are comparable to standard steel pipe, but the weight is only

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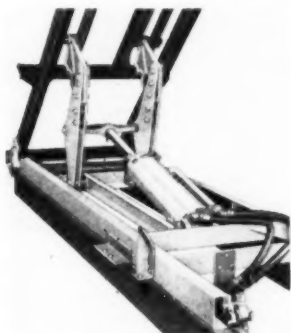
one-tenth as much. The interior is glass-smooth. The pipe is inert to salt water and is not affected by sunlight, weak acids and crude petroleum; it withstands temperatures from minus 40 to plus 220. Full data from Bettis Corp., PO Drawer 9365, Houston, Texas.

Use coupon on page 24; circle No. 1-18

★ ★ ★

Hydraulic Hoist for Installation on Motor Trucks

The 770 hydraulic hoist has been redesigned to make it suitable for installation



on a wider range of motor trucks. The new model has a load capacity of 10 to 13 tons and is said to be especially suited to medium-duty contractor operations. It has a dump angle of 50°, with a mounting height of 14½ ins., and is recommended for use on 8-ft. to 12-ft. dump bodies. Data from Galion Allsteel Body Co., Galion, Ohio.

Use coupon on page 24; circle No. 1-19

Positions for Engineers

The City of Los Angeles, Calif., will hold nation-wide competitive examinations for City Planning Engineer, \$545 to \$677 per month, and Principal City Planner, \$715 to \$889 per month. Applications must be received in Room 5, City Hall, by 5 PM Feb. 3. Application forms and further information from City Civil Service Commission, Room 5, City Hall.

The City of San Diego, Calif., desires to employ a "high-calibre Training Officer to establish and administer a comprehensive training program for City employees." Salary \$417 to \$505 per month. Write Civil Service Commission, 453 Civic Center, San Diego, Calif.

A sales engineer is needed by an old-established company to work in a restricted field dealing with municipalities, engineers and industries. Travel required; will work out of Indianapolis, Ind. Sanitary or chemical engineer, preferably a graduate. Box MO, Public Works. Applications will be forwarded without acknowledgment.

A City Engineer-Street Superintendent is needed by the City of Monterey, Calif. College graduate with registration as engineer. For more details, write City Manager, Monterey, Calif.

Southern Municipal & Industrial Waste Conference

Sponsored by Duke University, UNC and NC State College, this conference will be held at Chapel Hill, N. C., March 19 and 20. The theme of the conference will be "Clean Streams in Our Southern Economy." More from Prof. Daniel A. Okun, School of Public Health, University of North Carolina, Chapel Hill, N. C.

For sale or rent

L-820 Lorain dragline-crane, 70' boom, 2 cu. yd. bucket, Kohler light plant. Priced right.

A. J. HANSON

Pineville, La.

NOTICE TO BIDDERS

City of St. Petersburg, Florida
Sealed proposals, invited by the City of St. Petersburg will be received by the City Manager at the Municipal Building, St. Petersburg, Florida until 2:00 P. M., Eastern Standard Time, Thursday, February 26, 1953, at which time they will be publicly opened and read aloud, for the construction of Improvements to the Water Supply System.

The Instructions to Bidders, Proposal, Form of Bid Bond, Agreement, Specifications, Plans, Form of Performance Bond, and other Contract Documents may be examined at the office of the City Engineer, Municipal Building, St. Petersburg, Florida, and at the office of Greeley and Hansen, Engineers, 220 South State Street, Chicago 4, Illinois. Copies of the Contract Documents may be obtained from the Engineers or from the City Engineer upon the deposit of Twenty-five Dollars for each set, to be refunded upon the return of such set in good condition within 30 days after the opening of proposals.

Each proposal must be submitted on the proposal forms included in the Contract Documents and must be accompanied by a certified check on a solvent bank or trust company, made payable to the City of St. Petersburg, in an amount of not less than five percent of the total bid, or a bid bond of like amount, on the form set forth in the Contract Documents, as assurance that the bid is made in good faith. Cashier's checks will not be accepted.

Bidders must enclose with their proposals, in a separate sealed envelope complete information as to experience, equipment, and financial condition on the form provided. Failure to submit this statement will constitute basis for rejection of the proposal.

The City of St. Petersburg reserves the right to reject any or all bids, to waive any informalities in bids, to readvertise, and to accept the bid which is deemed most favorable to the best interest of the City.

CITY OF ST. PETERSBURG
By /s/ Ross E. Windom
City Manager

Dated January 6, 1953
St. Petersburg, Florida

CHIEF BUILDING INSPECTOR—

The City of Bakersfield invites applications for the position of Chief Building Inspector to have full charge of Building Department. Must be qualified to check structural plans and to perform and train others in field inspections. Experience in administration of Uniform Building Code highly desirable. California engineering registration desirable but not required. Salary open. Write Earl J. Miner, Asst. City Manager, P. O. Box 61, Bakersfield, Calif.

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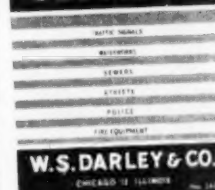
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EASY TO USE—Operate by colorimetric comparison method. No single standards to handle. Each complete set of standards in single plastic slide.

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Worth Telling

by Arthur K. Akers

(See also next page)

★ **JOSEPH J. SWENSON**, long vice president—sales of AMERICAN CAST IRON PIPE COMPANY, retired, did not stay retired: he is the new City Manager of his home city, Mountain Brook, Ala., Birmingham's de luxe suburb.

★ **AMERICAN CAST IRON PIPE COMPANY**, Birmingham, announces **ARNOLD HERRMAN** as assistant general sales manager. **JAMES B. HILL** succeeds him as manager of their Kansas City office.

★ **BELCO INDUSTRIAL EQUIPMENT DIVISION**, Paterson, N. J., surprises us with word that old-friend **HAPGOOD KIPP**, formerly chief engineer of AMERICAN WATER SOFTENER COMPANY, Philadelphia, is now district manager at Belco's new Philadelphia office. Other Belco appointments; **VINCENT R. CIOFFI**, whom we hope to know better, as sales manager; **MARTIN J. SHERRY**, manager of California offices in North Hollywood; **JOSEPH STOY**, Houston, Texas branch manager.

★ **E. N. SHELTON** succeeds **F. B. PORTER**, retired, as sales manager, The TENNESSEE CORPORATION (Ferri-Floc to you) in Atlanta.

★ **CATERPILLAR TRACTOR** has named **JACK H. GILL** as assistant manager of its Industrial Division in the general sales department, Peoria.

★ **BUILDERS-OMEGA**, Providence, have opened another new office—in Buffalo at 3053 Main Street.

★ **UNIVERSAL CONCRETE PIPE COMPANY**, reputed the world's largest, begins operation of its 26th plant this month, at Miami, Fla.

★ **R. KENNETH PLUMB** has moved from manager of slag sales, AMERICAN STEEL & WIRE DIVISION at Cleveland, to a similar post with UNITED STATES STEEL COMPANY, Pittsburgh, according to Managing Director **Ed. BAUMAN** of the NATIONAL SLAG ASSOCIATION, Washington.

★ **A LITTLE MORON** asked if you build a house from the bottom up or the top down. The man answered: "From the bottom up, you crazy fool." So the Little Moron yelled up "Come on down, Joe; we gotta start all over."

TO PLAN A MODERN INCINERATOR...

EVERY MUNICIPAL
AND DESIGNING ENGINEER
NEEDS THIS INFORMATION

What clearances (head-room) should you allow for fine type grapples or buckets?

Do you make proper allowance for the refuse that hangs below the bottom of the bucket?

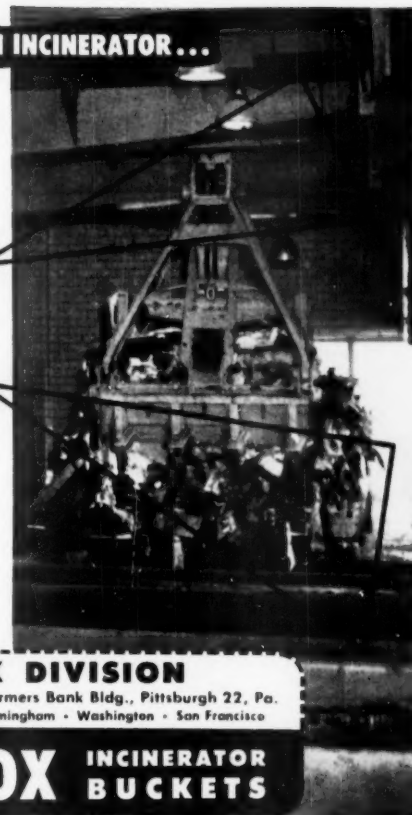
BLAW-KNOX BULLETIN 2350

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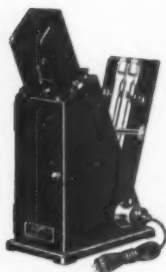
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HELLIGE
 INCORPORATED
 877 STEWART AVENUE, GARDEN CITY, N.Y.

Worth Telling

by Arthur K. Akers



★ **WE HAVE BUILT** a lean-to on to our Welcome mat, to provide room for all our new fellow workers in this Vineyard: Columnists 'Doc' Symons and Leo Ritter last month; now **GEORGE E. MARTIN** as highway editorial consultant this month. See special announcement on page 80.

★ **A. O. PUTNAM**, is now public relations director of **LAYNE & BOWLER COMPANY**, Memphis; a new responsibility that puts advertising and public relations for this big and growing firm into one pair of capable hands.



Mr. Putnam



Mr. Poulter

★ **JOHN POULTER** now heads **KOEHRING COMPANY** engineering at Milwaukee as chief engineer. We met John at the Highway Research meetings in Washington last winter, and he looked exactly like this picture.

★ **WE STARTED** to welcome all our new advertisers by name here but the list got too long. However, we still welcome them, *en masse*.

★ **SMITH-BLAIR, Inc.**, South San Francisco, announces appointment of **F. F. OSBORNE** as general sales manager. Smith-Blair are stated to be the largest manufacturers of repair clamps, flexible pipe couplings, and water works specialties on the West Coast.

★ **ONE THING** we like about this columning is the meals. A recent one was a luncheon at the Waldorf-Astoria to help **ARNOLD GOTTLIEB** celebrate his 50th anniversary in **GOTHAM CONSTRUCTION CORPORATION**, New York, of which he was co-founder. Former Postmaster General **JIM FARLEY** was principal speaker, with **LEE E. COOPER**, real estate editor of the **NEW YORK TIMES** as toastmaster. Mr. Gottlieb

himself made the best speech. In ten words he said "Thank you!"

★ **WE COULDN'T HELP** noticing that when **RAY WIGGERS**, advertising manager of **FRANK G. HOUGH COMPANY**, came to New York last month to tell the I.A.A. meeting of their successful techniques for turning ad inquiries into orders that he put his show on the road with a **PUBLIC WORKS** inquiry. But, of course, he had more of *them* to work with!

★ **LINK-BELT COMPANY** had a 3-day house warming at their new Colmar, Pa. plant. Our Col. **BILL HARDENBERGH** went down to help, and reports he was amply rewarded with what he saw and heard. President **R. C. BECHLER**, general manager **L. J. CARSON**, and he who is always "Mr. Link-Belt" to us—**JOE GILBERT**—did a magnificent job, by all reports.

★ **REMINGTON-RAND, Inc.**, New York, has a new administrative sales manager, **HAROLD R. HUNGERFORD**, in charge of accounting and tabulating equipment.

★ **TO BE ALLITERATIVE**, Birmingham's loss is Burlington's gain. That is, our long-time friend, **CHARLES S. NORTHEN**, becomes vice president—sales of **UNITED STATES PIPE &**



Mr. Northen



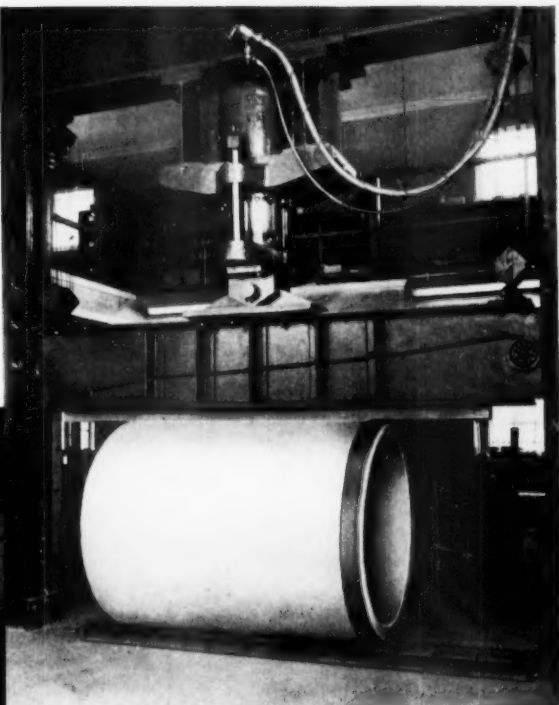
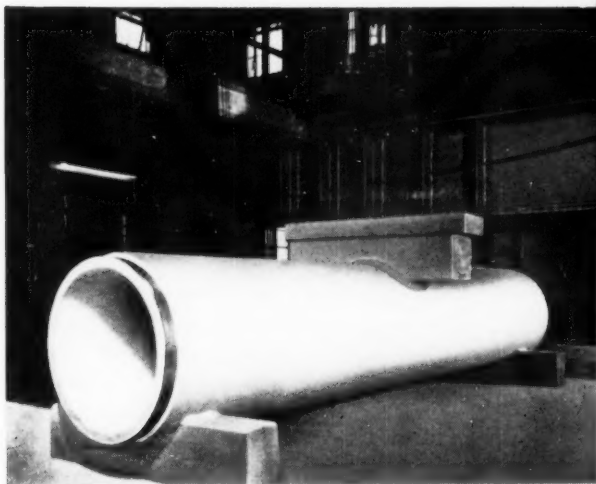
Mr. Garrett

FOUNDRY COMPANY, succeeding another old friend, **D. B. STOKES**, retired. **ROBERT E. GARRETT** is also up from Birmingham as vice president.

★ **CHAMPION CORPORATION**, Mond, Ind., announces that they not only clean sewers but have elected six officers, headed by **GEORGE KNOERZER**, president, and **RUSSELL SKELTON**, vice president—sales.

More Worth Telling on Page 113

test after test
assures the best
IN LOCK JOINT
CONCRETE PRESSURE PIPE



▲ Three edge bearing test in 300,000 pound capacity testing machine.

◀ Determining a pipe's beam strength in 300,000 pound capacity testing machine.

Do you have conclusive proof of the fundamental characteristics of the pipe you intend using in your next water works project? Are you certain of its advantages? Do you recognize its limitations?

• • •

In Lock Joint's laboratory at Wharton, N. J. all guess work has been eliminated. Here, Lock Joint Pipes of all types and designs are tested to determine the exact extent of their ability to withstand back loads, beam loads and internal pressures. The most efficient modern

equipment in the hands of highly trained personnel is used to give a tangible, practical demonstration of the high quality built into every type of Lock Joint Pipe.

• • •

These constant tests of our products are your assurance that, in its field, no finer pressure pipe than Lock Joint can be produced. Built in diameters from 16" upward and designed for any pressure common to water works practice, these pipes will serve you unflinching for generations.

SCOPE OF SERVICES: Lock Joint Pipe Company specializes in the manufacture and installation of Reinforced Concrete Pressure Pipe for Water Supply and Distribution Mains 16" in diameter or larger, as well as Concrete Pipes of all types for Sanitary Sewers, Storm Drains, Culverts and Subaqueous Lines.

LOCK JOINT PIPE COMPANY

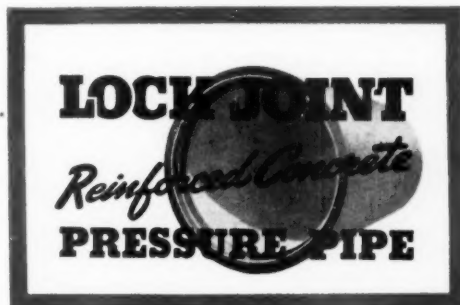
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PRESSURE PIPE PLANTS: Wharton, N. J., Turner, Kan.,
Detroit, Mich., Columbia, S. C.

SEWER & CULVERT PIPE PLANTS:

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Okla. • Tulsa, Okla. • Beloit, Wis. • Hato Rey, P. R. • Caracas, Venezuela



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When you look at a single W&T Chlorinator you can't see the basic research, the complete line of equipment, and the service that are behind it.

For instance, the engineer, the plant operator and the taxpayer all benefit from W&T's complete line of equipment. In the selection of equipment for a water supply — large or small — the engineer can always find a W&T Chlorinator to fit the requirements. The plant operator knows that this complete line can provide a W&T Chlorinator designed to help him provide safe water with his particular plant layout. The taxpayer is assured that money spent for W&T Equipment fitted to the present as well as the future needs of his community will provide long range economy.

These advantages of W&T's wide selection of equipment are probably one reason so many people use W&T Chlorinators.

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